THE OLD TIMER'S BULLETIN

OFFICIAL JOURNAL, ANTIQUE WIRELESS ASSOCIATION, INC.

Published for the Collector, Historian and Old Time Wireless Operator

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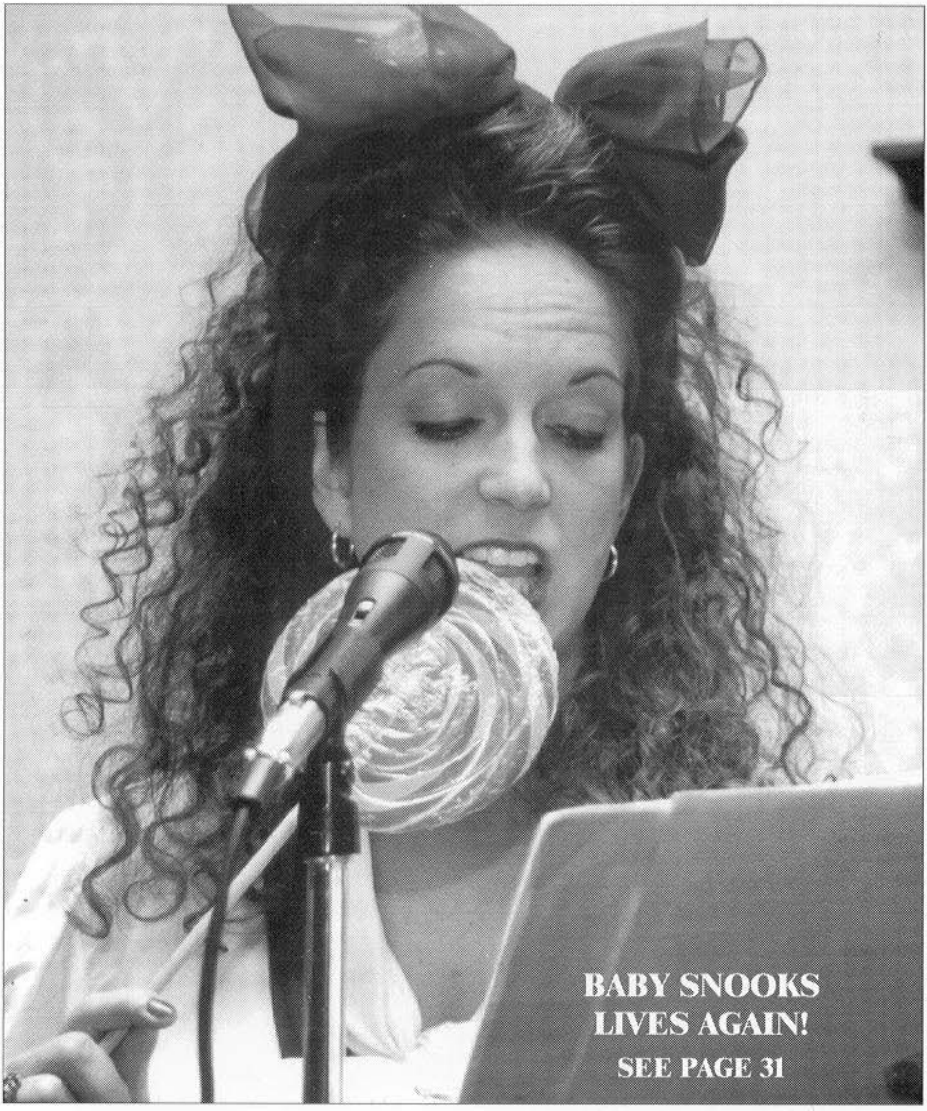

BABY SNOOKS LIVES AGAIN!

SEE PAGE 31

ANTIQUE WIRELESS ASSOCIATION, INC.
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BREESPORT, NEW YORK 14816

"The Old Timer's Bulletin" — The AWA Journal

The Old Timer's Bulletin is published approximately four times a year by and for members of the Antique Wireless Association, Inc. AWA is a nonprofit historical society founded in 1952 and chartered by the State of New York. *The Old Timer's Bulletin* is available through AWA membership. Its issuance is subject to change from time to time as to frequency, content, and size. It is not liable in any way for any buying-and-selling transaction entered into as a result of its content.

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Please write legibly. Enclosing an SASE speeds replies.

Dues and address changes: Joyce Peckham (Secretary), Box E, Breesport, NY 14816, (607) 739-5443; FAX: (607) 796-6230. Dues: 1 Year, $15; 2 Years, $27; overseas (airmail), $18. Make checks payable to "AWA."

AWA official business: William B. Fizette, (President), RR 1, Box 55, Henryville, PA 18332, (717) 629-0637.

OTB Submissions: Marc Ellis, Editor, *OTB,* PO Box 1306, Evanston, IL 60204-1306, (847) 869-5016.

Orders for the *AWA Review* or back issues of *OTB:* Debbie Roloson, 2 Walnut Place, Apalachin, NY 13732, (607) 625-3031.

Want ads and coordination of slide/video shows: Richard Ransley, PO Box 41, Sodus, NY 14551, (315) 483-9307.

Museum operation: Bruce Kelley (Curator), 59 Main St., Bloomfield, NY 14469, (716) 657-7489.

Annual conference business: Bruce D. Roloson, 2 Walnut Place, Apalachin, NY 13732, (607) 625-3031.

Financial reports: Dexter Deeley (Treasurer), 8 Briar Circle, Rochester, NY 14618, (716) 381-9633.

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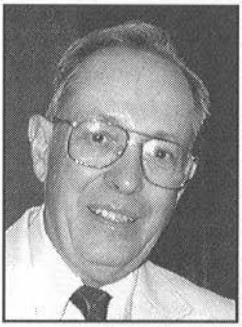
THE PRESIDENT'S MESSAGE

The 1996 AWA international convention is now history, and judging from the various communications received here, it was a resounding success. We all owe a debt to those dedicated members who shouldered the load of planning and facilitating the meetings. It was a lot of work, and as we all saw, the detailed planning and attention to detail paid off. The auction was the largest in our history, the flea market was full, and we filled the 200 hotel rooms allocated to us. Elsewhere in this issue you will find a detailed report.



Many thanks to Bruce and Debbie Roloson, Lauren and Joyce Peckham, Bob and Mike Raide, Ed Gable, Ralph and Elinor Williams, Dex Deeley, Bruce Kelley and all the others who worked to make this conference possible. Thanks also to all of you who came, entered the contest, attended the events, and made our conference the lively and memorable event that it was. Incidentally, Lauren is already lining up programs for the 1997 meet. The theme will be "television."

Our addition to the museum annex is now in use, and Curator Bruce Kelley and his crew are busy getting it in shape. The fund drive to pay for it is coming along nicely, and some contributions that arrived as the *OTB* went to press have brought us up to about $23,000. Our sincere thanks to all who have contributed either cash or equipment for sale at the auction. While this is excellent progress towards our goal, we still have a long way to go. Incidentally, we wish to bring to the members' attention two avenues for making contributions. First, many companies still have a matching funds program for their employees and retirees. Second, it is a very simple legal process to make a bequest of either cash or collectibles to AWA in your will. Contact me or Dexter Deeley for the details and we can send you the exact wording.

One other item is of current interest. We have an opportunity to purchase the tract of land where the museum annex is located. Your board of directors has voted to take advantage of this opportunity in order to protect our investment in the building and provide a permanent home for our increasingly valuable collections. There is also room on the site to construct a permanent museum building in addition to the annex. But let me emphasize that we have no plans at present to construct more buildings. We have quite enough to occupy us for the foreseeable future!

One final note: The newly-released Vol. 10 of The *AWA Review* has attracted a lot of interest and attention, as evidenced by very brisk sales. You'll find an outline of Vol. 10, along with ordering information, on page 39 in this issue.

— Bill Fizette, K3ZJW

FROM THE EDITOR

I'm starting my fourth issue of the *OTB* with some very pleasant memories of the just-concluded Rochester conference. The chock-full flea market, opportunities for face-to-face conversations with people I'd previously chatted with only over the phone, the many interesting speakers, the contests — well, suffice it to say that I had a really great time!

Now I'm back to reality again, scrambling to get November out on time after being off three weeks (Elgin Conference, Rochester Conference and a week with relatives). And in addition to pulling all of the articles and letters together, we're trying to address some of quality issues that have been emerging over the past several months.

One of the issues has to do with readability. You'll notice that the type used in this editorial looks a bit different from our standard type as seen in the rest of the book. It is, in fact, a test of a possible successor to the Times New Roman font in which the *OTB* has been set for lo these many moons.

Almost as long as I've been *OTB* editor we've been receiving occasional complaints about the type being too light for easy readability. Bill Fizette, our president, personally investigated some of these and found that almost every complainant knew a few other subscribers who were having similar problems.

What clinched it for me was a mail communication I recently received from one of our contributing editors. It came much later than expected, and when I opened the envelope I found out why. The letter was still inside the original misaddressed envelope, on which there was a scrawled note: "If I had been able to read your address on the masthead, this wouldn't have happened!"

It appears that the problem began when the *OTB* switched over to all-electronic publishing, with type and graphics being sent to the printer on computer disk instead of pasted down on boards. This changeover, necessary to get soaring costs under control, has saved the club significant amounts of money, but the electronic typefaces seem to print out much lighter.

You are reading these words in Times Semi Bold, a font that should be significantly darker than the Times New Roman we normally use. I'm looking forward to seeing how it will look when this piece is printed. Your comments are also invited. We plan to continue working on the readability problem until we find a solution consistent with our severe financial constraints.

On another issue: As any editor who deals with articles on the history of technology knows, certain contributors to the science of electrical communication are perennially surrounded by controversy. These are individuals whom the Gods of history and/or commerce seem to have neglected. Their innovations have apparently not been properly recorded in the annals of human accomplishment and/or the annals of the patent office.

Interestingly enough, though many decades have passed since these men have done their work, most of them have attracted a following of people who are dedicated to keeping their names and accomplishments alive. Leave such an inventor out of an article touching on his area of expertise (or include him without attributing enough credit) and there's a good chance you will receive at least one letter setting you straight.

I thought it might be interesting to see a feature article developed around these "unsung" inventors, one that would take a dispassionate look at their contributions and attempt to give credit where credit is due. Such an article is now in the discussion stage, and the prospective author has asked me to help identify the individuals who should be covered.

I immediately thought of Mahlon Loomis, Nathan Stubblefield, Nikola Tesla, Father Murgas and Charles Herrold. After that my inspiration dried up, so I thought it was time to involve the OTB readers in the project. If you have someone to add to the list, write me and tell me who and why. But if you don't contact me now, no fair complaining after the story finally appears!

— Marc Ellis, N9EWJ

WANTED

EDITORIAL ASSOCIATE (VOLUNTEER POSITION)

Chicago-area AWA member needed to assist OTB Editor with author correspondence, proofreading and various administrative duties. If you have some time to spare and would like to get involved in the OTB operation, contact Marc Ellis, PO Box 1306, Evanston, IL 60204-1306. Phone (847) 869-5016.

AWA News

OTB POLICY ON PROMOTING EVENTS

The OTB is pleased to list the meets and meetings of any established antique radio organization, whether or not it is associated with the AWA. Please send your information to Joyce Peckham, Box E, Breesport, NY 14816. Closing date is six weeks prior to first day of month of issue.

CALENDAR OF AWA ACTIVITIES

Nov. 3 — Board of Directors Meeting
Nov. 9-10 — OT 20 & 40 m. DX Party
Dec. 7 — AWA Florida Meet
Dec. 7-8, 14-15 — 1929 80m. QSO Party
Jan. 3-5 — 160m. QSO Party
Feb. 26-27, Mar. 1-2 — Regular OT Contest (20-160m.)
May 2-3 — IHRS/AWA Regional Spring meet

(see below for detailed information on meets)

CALENDAR OF MEETS

*(AWA-Sponsored event dates in **bold** type)*

SOUTHERN CALIFORNIA ANTIQUE RADIO SOCIETY

November 15-16

Airtel Plaza Hotel and Conference Center, Van Nuys, CA. Fri. night program and Sat. brunch. 2-day swap meet. Swap meet starts 7 a.m. Friday. Hotel phone (818) 997-7676. For info: (818) 242-8961 (Floyd).

AWA FLO RIDA MEET

December 7

Stewart Elementary School, 7905 15th Ave. NW, Bradenton, FL. Swap meet 8:00 a.m.-1:00 p.m.. For info: Norm Smith (941) 792-0003.

IHRS/AWA REGIONAL SPRING MEET

May 2-3

To be held in Indianapolis Indiana. No additional information available at this time.

MID-ATLANTIC ANTIQUE RADIO CLUB

June 13-15

Third Annual Radio Activity. Featuring the postwar decade 1946-56. Holiday Inn in Timonium MD (Just N. of Baltimore). Giant Trader's Mart. Old Equipment Contest. Guest Speakers. Special Presentations. Grand Auction. Banquet and Awards. Family Activities. Hotel phone (410) 252-7373. For info: Steve Snyderman (703) 978-3086.

PRIVATELY RUN SHOWS

NATIONAL VINTAGE COMMUNICATIONS FAIR
London, England

December 1

Hall 3, Wembley Conference Centre, London. 10:30 a.m.-4 p.m. Up to 300 leading dealers and collectors selling thousands of items relating to early technology and vintage media. Also on hand will be many of the county's specialist suppliers, collectors, magazines, clubs and societies. Admission £5; early entry (from 8 a.m.) £15; table (with two entry tickets and free classified ad in show guide) £35. For info: NVCF, 2-4 Brook St., Bampton, Devon, EX169LY or call Jonathan Hill on (01398)331532.

RECURRING MEETINGS

• **California Historical Radio Society** — Quarterly swap meets at Foothill College, Los Altos Hills, CA; May 4, Aug 3, Nov 2. Exit Magdelena off 280 freeway. The upper parking lot "T" gates open at 8 a.m. Regional events: May 18 (San Luis Obispo); July 6 (San Francisco); Sept 14 (picnic/meet-near Rio Vista); Oct 5 (Redding). General address is CHRS, PO Box 31659, San Francisco, CA 94131. 24-hour voicemail info: (415) 978-9100.

• **Delaware Valley Historic Radio Club** — This SE Pennsylvania club meets the second Tuesday of each month at North Penn Amusements, 105 Main St. (Rt. 113), Souderton. Membership $10/yr. For info: PO Box 41031, Philadelphia, PA 19127-0031, or Mike Koste (215) 646-6488.

• **Houston Vintage Radio Association** — Meets 2nd Tues. each month (except Jan. and Dec.) At Lai Lai Restaurant, Tides II Motel, Houston Medi-

cal Center, Main and Holcombe Sts., Houston, TX. Meetings include auction/program, 7-10 p.m. Assoc. publishes Grid Leak quarterly, monthly activity announcements. Membership $15/yr. Write: HVRA, PO Box 31276, Houston, TX 77231-1276, or call Richard Collins, (713) 778-0721.

• **Hudson Valley Antique Radio & Phono Society** — Meets 3rd Thurs. of month, 7 p.m. Meeting, swapmeet, and membership info: HARPS, PO Box 207, Campbell Hall, NY 10916, or call John or Linda Gramm at (914) 427-2602.

• **London Vintage Radio Club** — This Ontario, Canada club meets on the last Saturday of January, March, May, June and November. (But for 1996 only, the November meeting will be on the 23rd). Annual September meet with the Toronto club. Contact: Lloyd Swackhammer, VE3IIA, RR 2, Alma, Ontario Canada. (519) 638-2827.

• **Mid-Atlantic Antique Radio Club** — Meets monthly, usually at New Hope Seventh Day Adventist Church, Burtonsville, MD, Saturdays or Sundays, depending on time of year. Contacts: President Sam Cannan (410) 255-7728, or Membership Chairperson Jay Kiessling (410) 239-1818.

• **New Jersey Antique Radio Club** — Meets 2nd Fri. each month, 7:30 p.m. Holds three annual swap meets. Contact (send SASE): Tony Flanagan, 92 Joysan Terr., Freehold, NJ 07728, (908) 462-6638.

• **Oklahoma Vintage Radio Collectors** — Meets 2nd Sat. each month, Spencer's Barbecue Restaurant, NW 63rd and May Ave., Oklahoma City. Dinner/socializing, 6 p.m.; meeting at 7. Membership, $12/yr., includes monthly Broadcast News. Info: SASE to OKVRC, PO Box 72-1197, Oklahoma City, OK 73172-1197, or call (405) 722-0595 or (405) 755-4139 eves.

• **Ottawa Vintage Radio Club** — Meets monthly (except June and July) in Conference Room, Ottawa Citizen, 1101 Baxter Rd., Ottawa, Ontario. Contact: Tom Devey, 601-810 Edgeworth Ave., Ottawa, ON K2B 5L5, (613) 828-5152. Membership: $10 Canadian/yr.

• **Texas Antique Radio Club** — New club forming in San Antonio area. Meeting dates to be announced. Contact: Joe Koester, President TARC, 7111 Misty Brook, San Antonio, TX 78250-3498. (210) 522-1662.

AWA NETS (EST)

PHONE:

Sun. 7247 kHz SSB, noon (NCS: N4FS); 3837 kHz, 3837 kHz, AM 4 p.m. (NCSs: W2ZM & W2AN)

Tues. 14274 kHz SSB, 2:30 p.m. (NCSs: KC3YE and W0FXY) 3837 kHz SSB, 8 p.m. (NCS N4FS)

Mon.-Wed.-Fri.: 3867 kHz, 9:30 a.m. (NCS: W2SHN)

CW:

Daily, 4 p.m., 7050 kHz (NCS varies)
First Wed. of each month, 8 p.m., 7050 kHz

2-M REPEATER (Rochester area):

Mon., 7:30 p.m. (NCS: W2ICE)
Receive 146.820 MHz; transmit 146.220 MHz

SERVICE SOURCES AVAILABLE

The AWA Source Sheet is a listing of parts suppliers and services for the radio collector. Cost: only a business-size self-addressed stamped envelope to AWA, Box E, Breesport, NY 14816.

AWA SLIDE/VIDEO PROGRAM

The Antique Wireless Association has available several historical documentaries to loan to affiliated organizations for club meetings and programs. There is no charge for this service other than return mailing cost. For info on loan conditions, to make reservations, or just inquire, contact Richard Ransley, PO Box 41, Sodus, NY 14551. The following are available:

VHS Video Programs

V-2 — "Electrons on Parade." 18 min. 1938 movie made at RCA's Harrison Plant showing production lines with closeups showing receiving tubes, including a short sequence on transmitting tubes. (Very rare movie.)

V-4 — "The British Receiver." Documentary of the AWA/BVPS meet with visit to Marconi's Chelmsford plant, the British Science Museum, and ending with series of collectible British receivers. (VHS program transferred from slides.)

V-5 — "The Early Years." Historical documentary narrated by Clarence Tuska telling of the early years of amateur radio, founding of the AARL and WW I military radio training school. (VHS program transferred from slides.

V-6 — "The Key." History of the telegraph/radio key covering early hand keys, semi-automatics and commercial types. Script by Lou Moreau, W3WRE. (VHS program transferred from slides.)

V-9 — "The Transatlantic Tests and 1BCG." Rare documentary/photographs showing early amateur operation leading to famous 1921 transatlantic tests.

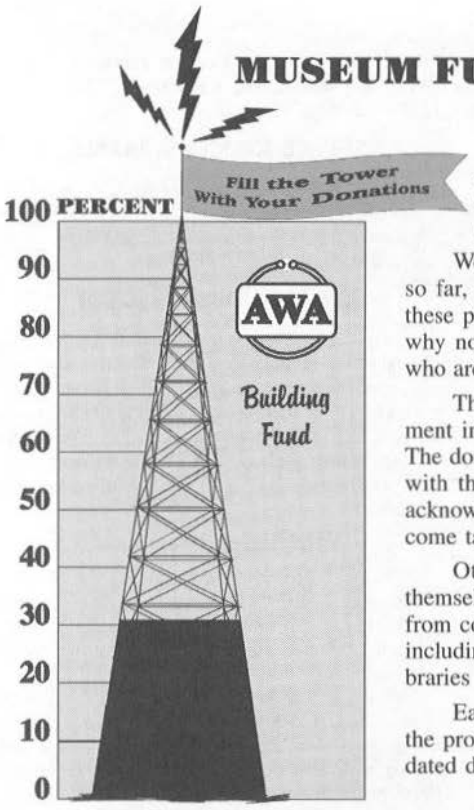
V-12 — "Those Wonderful Magazine Covers." The story of radio through magazine covers. Colorful with period music.

V-15 — "The WHAM Story." Details development of a pioneer radio station in Rochester, NY. Program developed with assistance and recollections of Art Kelly, the station's former general manager.

V-16 — "The Charles Herrold Story." Video propared by Mike Adams who donated this copy to the AWA. It documents the work of broadcasting's Forgotten Father who started broadcasting in 1912.

Continued on page 12

MUSEUM FUND DRIVE REPORT



Our museum building fund now stands at about $23,000, contributed by some 200 members. As you can see, we are just a little over 30 percent of the fund goal.

We are very grateful for the monies contributed so far, and are pleased to honor all contributors on these pages. If you haven't yet made a contribution, why not consider joining the ranks of the members who are helping us in this good cause?

Those who would like to donate saleable equipment instead of cash are definitely invited to do so. The donors' names will appear on these pages along with the donors of cash gifts, and all gifts will be acknowledged with a letter that can be used for income tax purposes.

Other vehicles which the members can avail themselves of to aid in this drive are matching funds from corporate sponsors and donations from estates, including both equipment and soft goods such as libraries and special bequests.

Each issue of the OTB will include a report on the progress of the building fund along with an updated donor list.

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(Those Giving $500.00 or More)

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(Those Giving $100 to $499)

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Irving Wild
Thomas Willard
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Donald Wriglew
Thomas Zenisek

SILENT KEYS

Ralph E. Aaron, 86, W4EEZ
Carl B. Bryant, 83, former president, Mid-South Antique Radio Collectors
Bradshaw Burnham, 83, W9BZN, physicist and engineer
Vernon Clifford, W2SN
James A. DiRuzza
Frank P. Maggiore, 59, N3FGN
George Milan, 89, W2WNN, engineer
Dan Morey, research scientist
Rudolph Zenker

GIOIA MARCONI BRAGA

Honorary member Gioia Marconi Braga, daughter of Guglielmo Marconi, died unexpectedly on July 15, 1996 at the age of 80. She was born in London, England on April 20, 1916 and educated at the Poggio Imperiale college in Florence, Italy. In 1974, on the centenary of her father's birth, Mrs. Braga founded the Marconi International Fellowship, an organization which annually awards a $100,000 grant to a scientist or engineer who has made a significant contribution to the field of communications.

During 1995, the centenary of her father's first wireless transmission, Mrs Braga was in constant demand, around the world, to speak about her father. The AWA was privileged to have Gioia as its keynote speaker for the annual convention last year, and those who attended will remember both her charm and her fascinating presentation. Gioia is survived by two children, Alegra and Michael. Our condolences are sent to her family.

Letters to the Editor

All letters to the Editor are read with interest and attention, though not all can be published in this column. Letters may be paraphrased, shortened or otherwise edited to fit the available space. The statements made by our correspondents are their own opinions and do not necessarily reflect the views of either the *OTB* staff or the Antique Wireless Association.

MARCONI'S TRANSMITTER LOCATION

In the book review (in 37-3 *OTB*), edited by William E. Denk, W31GU, of Peter R. Jenkins' *Early Radio — in Marconi's Footsteps,* the location of Marconi's high power transmitter in County Galway, Ireland was incorrect. The location is CLIFDEN not Clifton. The ruins (foundations of the buildings and towers) of the Marconi radio station are over-shadowed by the Alcock and Brown landing nearby in a bog at the end of the first non-stop transatlantic flight in June, 1919. (Bogs are notoriously poor landing fields as Alcock and Brown ended upside down!)

Although the Alcock and Brown landing site is marked by an obelisk and a limestone monument in town there is no recognition of Marconi's feat except a dinky wooden sign pointing down a trail that led to the site about a mile away (at least as of February 1983).

The Marconi site was ravaged during Ireland's war for independence, I was told. It would seem that an event of this historic importance deserves better!

Ernest C. Farkas, K3CBW
Baltimore, MD

THE LILIENFELD ISSUE

(Letter to Pat Leggett with copy to the OTB)

I noticed your question on Lilienfeld in the latest *OTB*. This turns up periodically, but the best treatment seems to have been in *Physics Today (enclosed were articles on Lilienfeld from the February, 1964 and May 1964 issues of* Physics Today. *—Ed),* which is likely where the *Analog* writer got his info.

I once corresponded with a chap who worked for the Doctor in 1930, on electrolytic capacitor electrolytes (glycols, as I remember) along with some former Amrad people. Lilienfeld never mentioned the solid-state amplifier during that time. Interestingly, Amrad's chief theoretician C.G. Smith also patented a germanium current amplifier in 1923 (US Pat. 1,679,448 — I've never sent for a copy of it). Smith never worked with Lilienfeld, but the one may have known of the other's patents. And you can take this for what it's worth, But Raytheon (where Smith was) claimed in 1952 to have made a germanium phototransistor in 1929; there's a picture of it in an ad in Tele-Tech for December 1952 (p. 77). Far as I know, no one (including Raytheon) has ever researched these developments and published any historical treatment. I have a bunch of old Raytheon phototubes from their lab, but I don't recall seeing any lumps of germanium in any of them. It may have been nothing more than a trial as an anode material in a standard phototube. Intriguing, though.

Presumably this was all gone over fairly thoroughly in the early 50's, when patents were being issued on such things, and memories were fresher. I'm not aware of any big patent suits, though, that would have brought this information to light.

Alan S. Douglas
Pocasset, MA

MORE TUBE TESTERS

Thanks to John Grady for his comments on tube testing, particularly on grid current. I rarely bother to make this test, since so few tubes fail it, but after some comparative trials, I see why: most tube testers simply aren't sensitive enough.

Nearly all Hickoks make a gas test by inserting a 180k resistor in series with the grid, which causes a shift in grid bias and therefore plate current and in turn Gm, if any grid current flows. This will find the really gassy tubes, but wasn't sensitive enough to catch a "test" 35 tube with 3 microamps of grid current (I had to check six or eight 35s to find one that bad). I tried a TV7, a TV10, and a 539C with equal lack of results. A Triplett 3423 using a 1-meg grid resistor was no better. A Heath TT-1 had a very sensitive grid-current test, but was hopelessly difficult to interpret (even good tubes gave large meter readings).

However the Hickok models made for Western Electric (the KS-15560 and 15750 at least) actually insert the Gm meter into the grid circuit, and measure microamps directly. So do the Hickok Cardmatics, the Weston 686 analyzer, and the AVO (British) models. Any of these will give unambiguous results.

Curiously, the overrated TV2 (the one with the six panel meters) gave a reasonably good grid-current test, even though it uses the standard Hickok circuit in most respects. All other Hickoks call for rebiasing the tube nearly to cutoff before making the gas test, while the TV2 does it at normal bias, where the effect on the plate current is much greater. (What do I have against the TV2? It's slow and a pain in the

neck to set up, its meters are unreliable, and it will not read out directly in Gm.)

You can check emission in a Gm tester by switching the heater to the next lower voltage and watching for any drop in Gm reading (the better testers have a button that reduces the voltage by 10 percent).

Weak tubes may work fine in the average kitchen radio, but I don't want them in a piece of test gear or a communications receiver. There are enough of most tube types to last another thousand years (the equipment that used them is largely gone) so hey, live a little, crush that Silvertone 6AU6. It's only a lousy tube. (No, I don't throw away weak 35s — I don't even throw away dud 35s — the guy a thousand years from now is welcome to all of them.)

And I still prefer Gm testers to emission types. When you can buy a nice Hickok for less than fifty bucks, why not go first class? Sure, emission readings correlate quite well with Gm (not perfectly though: *grids* may not move, but *filaments* certainly do). But isn't it better to measure the parameter that most nearly equates with amplification, rather than a secondary cause?

Alan S. Douglas
Pocasset, MA

* * *

I read with great interest John K. Grady's comments on vacuum tubes and the testing thereof in the August 1996 *OTB*. The "positive grid syndrome" is rarely if ever addressed in service and technical literature, but is definitely a problem in the maintenance area. During my radio/TV servicing years, we gave the name "grid emission" to this effect, which according to Grady is not the cause — but the result would be the same.

I rationalized that the cause was contamination of the grid with cathode coating material, probably erroneously. I observed the problem most frequently in power output tubes such as 50L6, etc. The "syndrome" could take up to an hour to develop fully, causing the grid to become as much as 10 volts positive. This would result in high current and extreme distortion.

Before someone yells "leaky coupling capacitor," the coupler could be removed with no effect on the voltage. Measurement of the grid return resistor would reveal no problem and replacement of the capacitor would offer no improvement.

I recall having problems with Philco TV sets having 6CB6 tubes in the i.f. amplifier. These sets often would develop severe overload after being on 15 minutes or so. Measurement would reveal a very high negative voltage on the input side of the AGC filter resistor (on the order of 1-megohm resistance) and a small positive voltage on the grid return side. It was frequently necessary to replace all the i.f. strip tubes to effect a cure.

Mr. Grady's comments on transconductance testing were also interesting. His conclusion can be rationalized if one recalls that some very excellent receivers, such as the Transoceanic, have been built using five tubes which have an average transconductance only 1/3 to 1/2 the value of their "standard" counterparts. I refer to battery-operated tubes such as the 1U4, 1T4, 1R5, etc. as compared to the 6BA6, 6AU6, 6BE6, etc.

John T. Kaetz, Jr., W4GUF
Bessemer, AL

"OOPS" DEPARTMENT

(From a letter to AWA President Bill Fizette)

. . .I was gratified that my slender article on IF xtals *(The Single Crystal IF Filter, p. 24, OTB 37-3 -- Ed.)* didn't get lost. . . Like always, a while later these things seem better written than one remembers. Be-

Continued on page 31

We'd love to make this shot a back-cover mystery photo, but we probably wouldn't be able to come up with an answer for the following issue. Alan Douglas, who found the image tucked into a 1924 issue of Radio *magazine, can't tell us much about it. "Gotta be the wildest tuner I ever saw." ventures Douglas, "or maybe the builder owned stock in a switch-point factory." The Editor will be glad to entertain comments from readers with other ideas.*

TELEVISION

EDITED BY

Richard Brewster

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Please include SASE for reply.

"WATCHING TV"

The November 1995 issue of the *OTB* included an article concerning the AWA's acquisition of a large number of antique television receivers from the Jack Davis collection. Some of Jack's collection went to the Museum of the Moving Image in New York City's Astoria, Queens, and at least one set went to the MZTV Museum in Toronto, Canada.

The MZTV Museum displays a large group of sets acquired by its chairman and executive producer, Moses Znaimer. The collection was recently on display at the Royal Ontario Museum in Toronto. A brochure produced for the exhibition, *Watching TV,* was provided to the author and is the subject of this month's column. (My preference would have been a visit to the display.)

The claim that the MZTV Museum is the most important grouping of historic North American televisions ever assembled is probably correct, since a significant portion of its holdings came from one of the foremost collectors in this country. Moses' interest in antique TV began during a visit with the renowned inventor, Peter Goldmark. He was there to see the now defunct EVR TV recording system, but Moses' attention was soon drawn to an "old" Philco Predicta standing in a corner. His reaction was "love at first sight."

Over a period of years, the MZTV museum has grown as Moses sought to put together a collection representing milestones in technology, design, or marketing. Some of the items in the collection are unique, such as the Felix used by RCA in its early tests. The Alexanderson Octagon set, made for the famous 1928 GE telecast, is also extremely rare.

The museum collection also includes an original Baird Televisor as well as the Lucite-enclosed TRK-12 displayed at the 1939 New York World's Fair. A rare tri-standard 1928 Daven mechanical set is also in the collection, as is an almost one-of-a-kind CBS-Columbia color wheel set.

Being a retired Westinghouse engineer, I must take exception to the claim that the CT-100 was the first NTSC-compatible set available to the public. In a June 1954 *Radio & Television News* column, it was noted that only production set available in March of that year was the Westinghouse 84OCK15. (Interestingly, the reviewer had to wait three days before a colorcast was available in NYC.)

Moses Znaimer is more than just a collector of antique television sets. He is co-founder, president, and executive producer of Toronto's independent television station, Citytv; the national cable and satellite music stations, MuchMusic and MusiquePlus; and the "newstyleartschannel," Bravo. Reading the final chapter, one understands that Moses is responsible for the "reinvention of television," at least in Canada.

The 48 page, 8" X 10½" exhibition brochure *Watching TV* is beautifully illustrated, displaying a wide variety of sets, both pre- and post-war, most in color. It is available from the MZTV Museum, 151 John Street #401, Toronto, Canada, M5V 2T2. The postage paid price is US $12.

Since the Royal Ontario Museum exhibition ended in September, we look forward to the next opportunity to view the MZTV Museum display.

— AWA NEWS

Continued from page 7

Slide Programs

S-1 — "Portrait of a Pioneer." The life of Elmo Pickerill.

S-2 — "Polar Adventure." Pictures taken by Bud Waite and his narration describing numerous trips to the Antarctic over a 35-year period.

S-3 — "70 Years of Vacuum Tubes." Describes the history of vacuum tubes.

S-4 — "The Early Years." (See description for V-5.)

S-7 — "The Transatlantic Tests and 1BCG." (See description for V-9.)

S-8 — "Trip Through the AWA Museum." Covers exhibits and equipment.

S-12 — "The Key." (See description for V-6.)

THE kr

By David W. Kraeuter
506 E. Wheeling St., Washington, PA 15301

We're all familiar with cycles (phenomena that continuously repeat) in the world of radio. We use this idea in terms designed to measure the very small periods of time occurring in electrical and electronic changes. We speak of cycles, kilocycles or kilohertz, Megahertz and so on. But the time periods I would like to discuss here are much longer than can conveniently be measured with oscilloscopes or frequency meters. I want to talk about the periods of time that are required to complete technological and/or sociological cycles in radio history and in the antique radio hobby.

For example, here is a years-long cycle of which I became aware shortly after I got into the old radio hobby. Actually this cycle is so long that I experienced only a part of it, though I realized that my parents, who were born in the early part of this century, had experienced the complete cycle. In those years, whether you "turned on" your radio by adjusting the cat's whisker or by throwing the switch, the radio performed immediately, or nearly so. The crystal set worked instantaneously, and the directly-heated tube filaments performed almost as fast.

Then toward the end of the 20s, a strange thing happened. After the invention of the indirectly-heated cathode tube and the abandonment of crystal sets, people had to wait several seconds for the tubes to warm up. (In the movies they warmed up faster than in real life.) Then, turning on the radio was not the casual, almost thoughtless act that it is today — one had to wait. That's how radios all were when I discovered them sometime in the 40s. But by the 50s and 60s the cycle had been completed. With the invention of the transistor, we once again no longer had to wait. I remember my dad remarking to me, "That new radio you got, it jumps right on!"

That cycle — from not waiting to waiting and back to not waiting again — took several decades. Oscilloscopes and MHz are not useful to measure it or even describe it. We need a new unit to designate and quantify these long-term cycles in radio history.

Since I am apparently first to recognize this phenomenon, and since I have found nothing in the antique radio literature that even hints at it, I propose to name it. In fact, with acknowledged immodesty, I propose to name the unit that measures these long-term cycles the *kraeuter* (abbreviated *kr*). Standard cgs forms of the unit are easily derived, such as the kilokraeuter (or kkr), the megakraeuter (Mkr), the microkraeuter (ikr), etc.[1]

Just as Mr. Ohm once had considerable difficulty in determining the exact value of an ohm, so I must admit I have had considerable difficulty in finding what the exact value of a kraeuter is.[2] Perhaps another example will help make the concept clearer.

I read in the last couple of years the statement that people stay in most hobbies for an average of about six or seven years. If this is true of the antique radio hobby, then we have another long-term cycle, and we might say, for example, that 1 kr of hobby interest is approximately equal to 6.5 years.

Still another example of a long-term cycle in the hobby is that of desiring, having, discarding, and desiring again. We're all familiar with a well-known manifestation of this cycle from antique radio want ads. It goes something like this: "I want this model and only this model and I'll pay whatever it takes to get it." Uh-huh. You had one during your formative years, you say? And you put it out on the curb for the garbage man when you were 30-something. Now that you're 50-something you really want to have it back. Well, too bad. By now it's about 20 feet deep in a landfill somewhere out of state. This cycle includes a five- or six-kr mistake of sad, sometimes desperate, dimensions.

To clarify further, I will mention one other cycle that I have detected and partially measured in radio history. This phenomenon has a *very* high kr value, and perhaps I have detected only the beginning of one cycle.

The cycle traces the perceived value of radio hardware. It starts back in the very early days of radio experimentation, years before the radio boom of the early 20s when many people made their own radios. The cycle began when radio pioneers like de Forest made their own one-of-a-kind *components* (the audion, for example). A few years and a few audions later the cycle brings us to Edwin Armstrong, who, we are told, was regarded rather enviously by some of his fellow radio enthusiasts because he possessed an audion when they had none.

Still further in the cycle (from the 1920s through the 1950s) when tubes and other equipment were comparatively more plentiful, we nevertheless supported a whole class of full-time radio repairmen to

Continued on page 19

Ed. Note: This article was originally published in the September 1944 issue of The Pittsburg Oscillator, the newsletter of the Pittsburg Antique Radio Society.

REGINALD A. FESSENDEN AND THE DEVELOPMENT OF RADIOTELEPHONY

By James P. Rybak
314 Quail Drive, Grand Junction, CO 81503

PART I: CONTINUOUS WAVES AND THE NEEDED DETECTOR

At the turn of the century, Reginald A. Fessenden was convinced that the approach most people were taking toward the development of wireless telegraphy systems was wrong. Marconi and virtually everyone else at that time continued a commitment to using spark gap transmitters to generate pulses of damped oscillations. It was clear to Fessenden that these pulses of damped oscillations had numerous drawbacks.

Attempts to tune receivers, transmitters, and antennas were made difficult by the high harmonic content of the damped oscillation pulses. Equally importantly, Fessenden knew that the system of radiotelephony that he wanted to develop required a source of continuous, undamped radio frequency waves.

The spark gap transmitters generated pulses of damped high frequency oscillations at an audio frequency pulse rate. Fessenden knew that these pulses of oscillations produced a convenient audio frequency tone in the headphones for the receiving telegraph operators to copy. However, he also knew that, if modulation of these pulses of oscillations were attempted, a loud audio frequency "buzz" would occur in the received signal which would drown out the voice or music being transmitted.

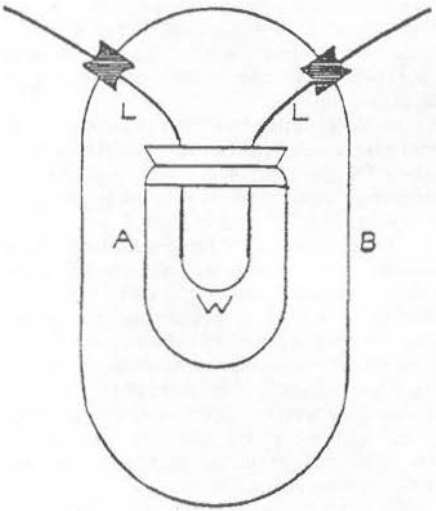

Fig. 1. The "hot wire barretter" (see text for key to callouts) was Fessenden's first continuously operating detector.

Fessenden had begun his electrical career by working with dc power distribution systems under Thomas A. Edison, but soon joined a branch of the Westinghouse Company which was developing ac power systems. As a result, he viewed radio frequency oscillations not in terms of pulses of spark-gap-produced oscillations, but rather as an extension of the continuous alternating current oscillations generated by alternators for electrical power systems.

Reginald Fessenden believed that the continuous radio frequency oscillations he wanted could be produced using specially designed alternators. The technology to do this, however, would require much developmental work. John Ambrose Fleming, who later would invent the first thermionic diode "valve" detector, insisted that an alternator like Fessenden wanted never could be constructed and would not produce useful radiation even if it were built.

Another major problem faced Fessenden in the development of a radiotelephony system. He needed a detector which was continuous in its operation. Fessenden knew that the coherer, which was then the most widely used detector for radiotelegraphy, was incapable of the continuous operation required.

The development of a continuously acting detector was the first significant success achieved by Fessenden toward his goal of achieving radiotelephony. He worked out this device, which he called a "hot-wire barretter," while on the faculty of the Western University of Pennsylvania (now the University of Pittsburgh) in the late 1890s.

The hot-wire barretter consisted of a small "U" shaped loop of very thin silver-coated platinum wire (labeled **W** in Fig. 1), which was enclosed in an evacuated glass envelope (labeled **A**) and connected to lead-in wires (**L**). This envelope, in turn, was surrounded by a second glass envelope (**B**), which was silvered to shield the wire loop from external radiation. The silver coating on the middle of the wire loop

was removed by a nitric acid etching process to increase the resistance of that portion of the wire.

The resistance of the hot-wire barretter changed when a wireless signal passed through the wire loop. The result was an audible response if a telephone receiver was connected in series to ground with the barretter, a battery, and a resistor.

This hot-wire barretter had low sensitivity but it did operate continuously. It provided a response which was approximately proportional to the amplitude of the received wireless signal and, therefore, would serve as a detector of amplitude modulated continuous oscillations .... if they could be generated.

Fessenden contacted the General Electric Co. in June of 1900 to see if it would design and build for him a high frequency alternator. GE agreed but indicated that it likely would take several years to achieve the design he wanted.

Later in 1900, Fessenden left his faculty position to work for the U.S. Weather Bureau. He was assigned to Cobb Island, MD, where his job was to develop a wireless telegraphy system which would enable remote stations to report weather conditions. Fessenden now could work on wireless telephony only in his spare time because radiotelephony was of no interest to the weather bureau.

Before leaving Pittsburgh, Fessenden had ordered made a rotary, mechanical "interrupter" which would increase to a much higher value the discharge rate of a spark gap transmitter. With this, the train of oscillation pulses produced, hopefully, would be less highly damped and could be more effectively amplitude modulated. Also, Fessenden hoped, the audio frequency "buzz" accompanying the detected signal now would be high enough in frequency so as not to be too objectionable.

Using this interrupter, late in 1900 Fessenden succeeded in sending the world's first radiotelephone transmission to a colleague over a distance of approximately one mile near Rock Point, MD. The audio quality of the received signal was poor but his transmitted spoken words were recognizable. Fessenden was still convinced that he needed a high frequency alternator producing continuous oscillations with a frequency of at least 100 kHz to achieve commercially acceptable radiotelephony.

The hot wire barretter was not adequately sensitive to be used as a commercial quality radiotelephone detector. Consequently, Fessenden continued his efforts to develop a better detector.

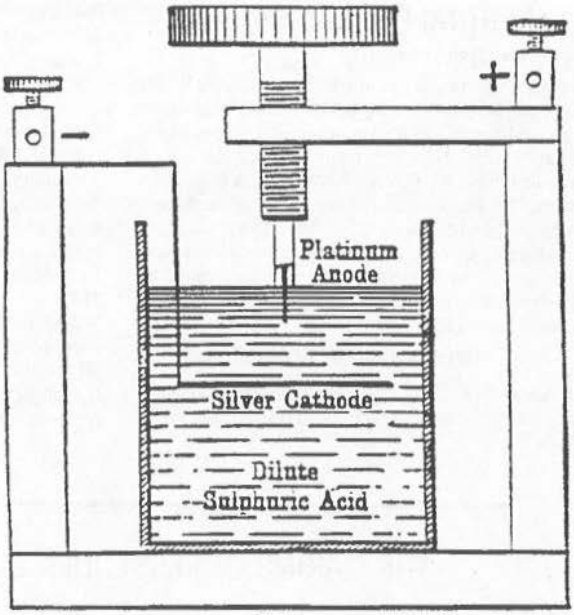

Fig. 2. Wide acceptance and usage of Fessenden's improved "liquid barretter" made it possible for many to hear his first radiotelephony broadcasts. (Figs. 1 and 2 from reference 5.)

The way to achieve a substantially improved continuous detector was found purely by accident by Fessenden in 1902. A wire filament for a hot wire barretter was left too long in the etching acid. The acid had dissolved the wire completely leaving only a stub of the wire in contact with the acid. Fessenden noticed, however, that a meter which had been connected to the wire to monitor the etching process was responding very vigorously to electromagnetic waves being generated elsewhere in the laboratory. He realized that he now had a truly sensitive continuously operating detector. Fessenden called this device the "liquid barretter."

A typical configuration of the liquid barretter detector is shown in Fig. 2. The device was simplicity in the extreme. The tip of a short piece of fine platinum wire barely made contact with the surface of a small pool of 20 percent nitric or sulfuric acid solution. A second, larger, electrode was deeply immersed in the acid solution.

The liquid barretter was not well suited for use on ships rolling on stormy seas because, for proper operation, the platinum wire stub could make only shallow contact with the acid. Nonetheless, this detector was widely used both on land and sea. The liquid barretter was the detector against which all

Continued on page 16

— REGINALD A. FESSENDEN

Continued from page 15

others were compared until de Forest's triode audion detector became the new standard many years later.

Although Fessenden obtained a patent on the liquid barretter in 1903, many violated that patent. Lee de Forest, for example, sold many of the devices to the U.S. Navy and to commercial wireless companies until prohibited by court order. Ironically, these infringements of his patent made possible a large "audience" for Fessenden when he later made his first radiotelephony "broadcast," which will be discussed in part II.

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THE MAKING OF FESSENDEN'S ALTERNATORS

Not surprisingly, given his former affiliation with Westinghouse, Fessenden first approached that company to get the high frequency alternator he wanted designed and built. Westinghouse declined to accept the job, apparently because the firm was busy designing the hydro-electric plant for Niagara Falls. Fessenden then turned to General Electric.

Charles Proteus Steinmetz was GE's leading designer of a.c. equipment when Fessenden ordered his first alternator in 1900. Steinmetz was intrigued by the challenge offered by Fessenden's request. But despite his best efforts, the first high frequency alternator produced only 10,000 oscillations per second, falling far short of Fessenden's needs. The limiting factor was the inability of the rotating armature to withstand speeds greater than about 3,760 rpm.

The next request Fessenden submitted to GE was for an alternator which could produce 150,000 continuous oscillations per second. This time the job of designing the requested alternator was assigned to Ernst Alexanderson, a young engineer from Sweden who had joined GE in 1902. Alexanderson had quickly impressed his supervisors with his ability to invent useful components for electrical power systems.

Before long, Alexanderson devised an armature which employed a winding on a stationery iron core positioned between two rotating steel disks with magnetic poles cut into their circumferences. A.c. currents were induced in the windings of the armature as the disks rotated. The rotational speed of the disks together with the number of poles determined the frequency of the oscillations produced.

Fessenden feared that the armature's iron core would result in unacceptably high losses due to hysteresis and eddy current effects. He directed Alexanderson to use a wooden armature core. Fessenden also directed that an electric motor, rather than a steam engine, be used to produce the rotation of the steel disks.

By early 1906, Alexanderson had succeeded in producing an alternator with an output frequency of approximately 50 kHz. He soon was assigned to oversee the design of all the high frequency alternators GE would produce for Fessenden and for others. Before long, the name "Alexanderson" became almost inseparable from the term "high frequency alternator."

—JPR

THE MILLER HIGH-FIDELITY AM TUBELESS TUNER

By John W. Haught
5268 Webb St., Aliquippa, PA 15001

The year is 1956. Eliza Dolittle has been reborn on Broadway in *My Fair Lady.* Top films in clude *Bus Stop, The Ten Commandments,* and *Invasion of the Body Snatchers.* Elvis Presley is a phenomenon.

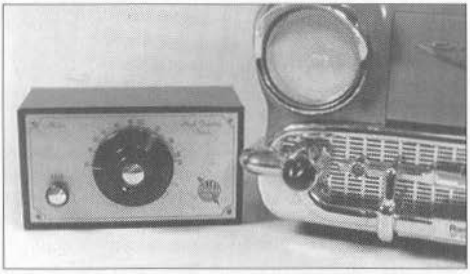
Also making its debut in 1956 was the J.W. Miller Co. Model 565 germanium diode AM tuner. It was available in kit form or factory wired.

The beginning sentence of the assembly and wiring instructions proclaims: "You are now the proud owner of a No. 565 Miller High Fidelity Germanium Diode Broadcast Band Tuner Kit.. . . .the only tuner of its kind." (and it was). The instructions go on to exclaim that the tuner is the result of masterful engineering and careful planning, and when assembled in accordance with the instructions, will give a lifetime of trouble-free performance.

The 565 tuner was designed to be fed into the phono or mike jack of a high-gain amplifier or preamplifier. The No 2075 adapter was available for those who preferred to use only earphones.

The recommended antenna was a simple wire approximately 75 feet in length, L-shaped, with the vertical portion rising from the tuner to the top of the house and the horizontal portion preferably stretched in a straight line across the roof or to some other support.

The Miller Company used a unique system to assemble the components on a vertical mounting plate, with the two controls (volume control and vernier station selector) projecting through the attractive front panel. The volume control consisted of a 1-megohm variable resistor connected across the tuner output.



The Miller tuner (cabinet only seven inches across) is dwarfed by a 1957 Chevy novelty AM/FM set.

Here's a look at the Miller's "innards" and a glimpse of the packaging and assembly instructions.

The Model 565 is fundamentally a diode detector using two tuned circuits. Mutual coupling is employed between the antenna and the RF circuits for exceptionally high efficiency. The output voltage is directly proportional to the input signal, and ranges from .07 to .7 volts on close-by stations within a 25-30 mile range.

This little gem was housed in an ebony bakelite cabinet measuring 4" x 7" x 3 1/2" and weighed only two pounds. It sold for $19.50.

In 1954 the tuner might very well have played though a Heathkit Model WA-P2 preamplifier and Model W-4AM amplifier connected to a Jensen Model SS-1 speaker system. After 40 years, it still brings back the most pleasant listening memories.

Although you might think that this tuner could be used only for reception of local stations, I have been successful in hearing many distant ones.

The Model 565 Tuner reflects the memory of the crystal radios of the 1920s and foreshadows the emerging high technology of the 1950s. Is it any wonder that it has become a rare and very collectable set?

HEADSETS

EDITED BY
Richard W. Mackiewicz
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Please include SASE for reply.

THIS 'N' THAT

WHAT'S IN A NAME?

Some headset manufacturers identified their models by adding a simple number/letter designation to their name on the phones. Others used very imaginative nomenclature. The Marinette Electric Corp. of Marinette, WI, manufactured two headset models: Blue Streak, and Little Tattler.

The Blue Streak was the better and more expensive model. The set had a D.C. resistance of 2,400 ohms, with twin electromagnets in each receiver. The receiver shells were aluminum with plain raised lettering. In both quality and performance, these could be favorably compared to Brandes Superior phones.

The Little Tattler sets had a D.C. resistance of 1,500 ohms, with single electromagnets in each receiver. Two variations exist. The early models had aluminum shells with fancy raised lettering similar to Davis and Peerless. The later models had black bakelite shells with handsome metal labels. These bakelite shells were certainly cheaper than the aluminum, though the extra cost of the labels probably offset the savings.

The headbands on the Blue Streaks are a bit different than those on the Little Tattlers, but the headbands on both the early and late Little Tattlers are the same. The caps and diaphragms will interchange between all three models. Any of these three models will make nice additions to a headset collection or display well with early crystal sets.

NON-FERROUS DIAPHRAGMS

Baldwin headsets were always highly regarded and still are, for that matter. Baldwin made these with fiber, aluminum, and mica diaphragms. Because of their unique patented design, Baldwin could employ non-ferrous diaphragms. The sets with the mica diaphragms seem to have always been the most in demand.

In 1923 the Radio Mica Products Co. of New York, in recognition of this fact, offered replacement diaphragms to enable conventional phones to simulate Baldwins. These diaphragms had a ferrous metal center with an outer mica surround.

If any of you experimenters wish to try making some of these, you can have a local sheet metal shop punch appropriate size centers for your phones (diameter large enough to cover pole pieces) from .005 - .007 steel shim stock. Edges should be de-burred. You may purchase sheet mica from Lehmans, Kidron, OH, (216) 857-5757. Note: they also have sizes appropriate for constructing those very early tuning capacitors.

If you ever open a set of phones and find one of these original Micaphone diaphragms, you have something rare, indeed.

Innovative product converted conventional headsets to use mica diaphragms.

Above, "Blue Streak" was the top of the Marinette line, comparing favorably with Brandes Superior. Above right, an early "Little Tattler" had an aluminum shell and raised lettering. At right, a later version of the "Little Tattler" had a handsome metal label applied to a bakelite shell.

— THE kr

Continued from page 13

whom we took our radios when they stopped playing. Then (1960s and 1970s) we began throwing radios away when they stopped playing, until (1980s and today) we throw radios away even when they are still playing — in some instances, no doubt, even *while* they are still playing.

Is this cycle complete? Perhaps, so far, my old Heath kr meter has detected only a few hundred millikraeuters of it. And perhaps now I am like Marconi was, listening . . . listening . . . far into the night for those few faint signals from far across the sea.

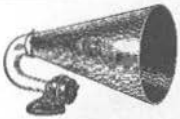
Notes:

1. I have searched the seven-volume, 3,400-page *International Critical Tables* and found no unit mentioned or defined for this function. Therefore, these terms will have to stand until the Standards and Measurements Committee of the Antique Wireless Association is next convened. (Do not confuse kr with Kr, the symbol for Kryptonite, which is the substance so dangerous to Dean Cain.)

2. This despite the fact that my mathematical training has not been slight. It includes the "times" tables, arithmetic (easy and hard), first and second year algebra, plain and solid-state geometry, and trigonometry. (And all of that *before* I went to college to prepare in the real classics—the Brontës, Bill Faulkner, Stephen King, etc.) Thus, a preliminary Heaviside quaternion transform allows me to state *aporetically* that:

$$\int dt\ kr\ \ mc^3 \bullet -1$$

However, I admit that a rigorous mathematical analysis for the value of kraeuter remains to be worked out, and it probably awaits some future Maxwell of the antique radio hobby.



THE LOUDSPEAKER

EDITED BY

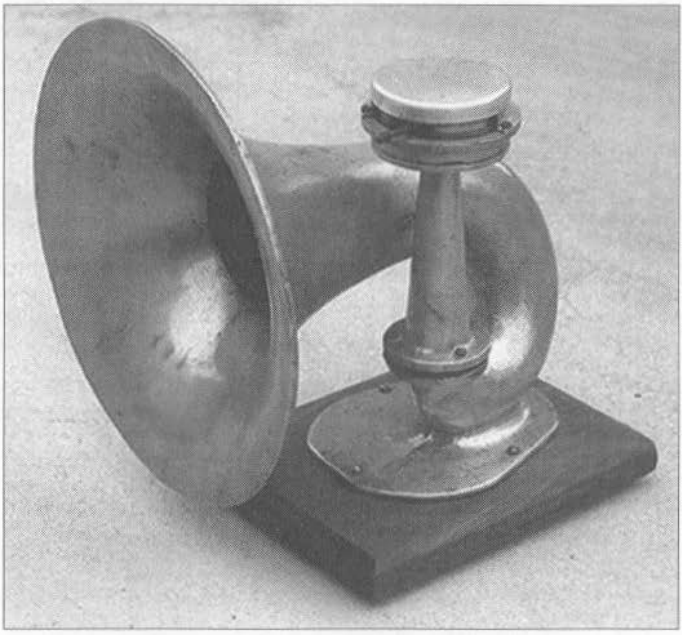
Floyd A. Paul, W6THU
1545 Raymond, Glendale, CA 91201
Please include SASE with correspondence.

TRIMM RADIO MANUFACTURING CO.

The Trimm Radio Manufacturing Co. began advertising its horn speaker products in late fall 1923. The first two horn speakers were given the name of Acousticola. The Acousticola Grand model was solid aluminum and is so unique in design that a quick look is all that is needed to verify its authenticity. A photograph of the Grand model accompanies this article. The second horn design was called the Standard and was a straight neck, upright horn speaker. Trimm's ads, of course, always publicized its well known line of headsets.

Trimm's ads came in bursts: November 1923 to May 1924, September 1924 to March 1925, and September 1925 to February 1926. Each burst of ads introduced the new horn speaker models. Ads were placed in the following magazines: *Radio Dealer, Radio News, Radio, Talking Machine World, Radio Broadcast, Electrical Record,* and *Radio Call Book,* among others. By September 1926, Trimm cone speaker products were making inroads into Trimm horn speaker ads.

Eight different horn models were advertised over the 1923 to 1926 period. The following table lists the models and gives essential details to help in the identification of Trimm horns. A ninth model called REX is listed. No ads have been seen but two REX models have shown up in collector's hands. The REX neck and bell part has the words "Miller Rubber Co." embedded in the rubber compound. The REX model may have been made for a distributor.



The distinctive Acousticola Grand is instantly recognizable.

SUMMARY OF TRIMM HORN MODELS

Ad Dates	Model	Description	Price	Volume Adjust	Dimensions
Nov '23 May '24	Acousticola Grand	solid aluminum	$35.00	Y	270° curve in bell & neck
Nov '23 May '24	Acousticola Standard	fibre straight neck	$22.50	Y	21½" high 10" diameter
Oct '24	Home Speaker Model 20	Volconite* straight neck	$10.00	N	22" high 10" diameter
Sep '25 Sep '26	Home Speaker Model 25	Volconite* gooseneck	$10.00	N	18" high 12" diameter
Nov '24 Sep '26	Concert Model 80	Volconite* gooseneck black or bronze	$25.00	Y	22" high 15" diamete
Oct '25 Sep '26	Entertainer Model 90	Volconite*	$17.50	Y	14½" high 12" diameter
Late '25	"Cabinette"	fibre bell mahogany finish	$17.50	?	13½" high 9" wide
Late '25	Cello	fibre bell walnut cabinet	$30.00	Y	9½" high 13½" wide
—	Rex (possibly manufactured for a distributor)	Miller Rubber Co. bell - black	—	Y	21½" high 14½" dia.

* Spelling as it appears in Trimm advertising, possibly a trade name.

The Concert Model 80, left, was one of the largest in the line. At right, the Home Speaker models offered attractive design, low cost.

AWA ANNUAL CONFERENCE AUCTION REPORT

Courtesy of Ludwell A. Sibley

Abbreviations used herein are: **BBT** — brass-based, tipped (tubes); **Book** — orig. manual; **COB** — (xero)copy of book; **HB** — homebuilt; **NE** — Northern Electric; **NIB** — new in box; **NT** — no tubes; **PS** — power supply; **rcvr.** — receiver; **W** — Westinghouse; **WE** — Western Electric; **WT** — with tubes; **xmtr.** — transmitter

ADVERTISING AND EPHEMERA

AK employees at factory, 1927 photo ca. 15", framed 400 AK folding display board, ship scene, ca. 4' wide by 20" high....290
Atlantic telegraph cable, framed hand-colored engraving....48
British Western Electric "Electric Mah-Jongg" card set, radio-related, new w/ scorepads in orig. box, fine....300
Crosley '30s dealer certificate & authorization letter, framed....50
Crosley illum. sign, 24" wide oval, "Appliances-Television," VG....50
Letter signed by S. Morse, matted & framed, w/ portrait photo....1,750
Philco store wall clock, ca. 14" plastic face....45
RCA key fob & tie clip, and RCA "Expert Color TV Service" thermometer, old logo, both NIB..55
RCA Victor showroom chair, chrome/vinyl....100
Ritz Crackers advertising tray, '20s....23
Stock certificates, Submarine Signal Co. and Mexican Tel. & Tel. Co., pre-'45....25
Zenith tin radio sign, repro./modern (not "our" Zenith)....14

COMMUNICATIONS EQUIPMENT

This was the usual separate (Ed Gable) sale on Thursday. "*" designates comm gear that appeared in the main auction on Friday.

GENERAL

Abbott TR-4 2-½ meter xcvr., exc....45
*Can. Marconi MSL-5 regen. ship rcvr., w/shock mount....180
Collins 75A-3, 2 filters, book, exc....370
Galaxy GT-550 xcvr., good, w/ PS....55
German "HRO" coils, set of 3 in coil box, very close to National, for 3-6, 6-12, 11-22 MHz; light gray; have ceramic contact boards, ceramic rotary trimmers, wide high-resolution paper dial charts; VG....140

Hallicrafters

S-19 Sky Buddy, VG (2)....40, 45
SX-28, cosmetically VG....160
*S-38, VG....33
S-40, VG....35
SX-42 w/ R-42 spkr., needs electronic work, cosmetically exc....190
S-85 rcvr., book, exc....40
SX-130, needs restringing, else exc., COB....45

Hammarlund

HC-10 SSB adapter, less case, VG....70
HQ-129X, less case, knobs changed, cosmet. VG....35
HQ-170, non-clock model, w/spkr....100
*HQ-170A, no-clock model, VG....80
SP-400, HB PS built-in replacing audio xfmrs, else good....35

Home-built

5-tube regen, w/ Bud coils in boxes, VG....45
QRP CW xmtr, 1-tube AC-DC w/ xtal, exc....55
*TNT breadboard xmtr, 210 tube, oldie....48

Heathkit

AT-1 xmtr, VG 75
MT-1 Cheyenne xmtr w/mic, less PS....40
SB-300/401 xmtr-rcvr w/cables, book, VG....60
SB-301/401 xmtr.-rcvr., books....60

— — —

Johnson Viking I, in almost-matching cabinet, shield added, recapped, works....50
Knight-Kit Span-Master regen., good....20
Kuhn (Cincinnati) 353A portable superregen rcvr., 26-175 MHz, VG....30
Lafayette "Lester" VHF conv., 6/10/11 m, VG....12
Lafayette KT-340 rcvr., VG....40
Millen "vari-arm" VFO, VG....65

National

FB-7, second pair of coils in orig. box, no PS, VG....250
HRO-5TA1, 4 coilsets, w/ coil box & Nat'l. spkr, HB PS, VG....170
NC-44A (model w/isol. xfmr), coax conn. added at side, else nice....80
*NC-98, exc....65
NC-101X, S-meter model, w/spkr, VG, COB....180
NC-177....70
RCQ, fair-good....80
SW-3, no coils, tubes, or PS, added switch & jack, else good....130
*SW-3, VG....200
SW-54, VG....22
Philmore CT-1 CB xmtr w/mic....10
RME 4350 and 4301 SSB selector, exc., COB for 4301....130
RME 4350, less case, VG cosmet....35

MILITARY

*R-1051D/URR w/ shock mount, VG, COB.....380
T-18/ARC-5, NIB, untouched.....65
BC-1306 (SCR-694), less tubes and guard bars, else exc.....40
BC-454, NIB, untouched, no dynamotor.....25
R-390A/URR, tuning knob changed, no nameplate, else exc.....170

AMPLIFIERS & AUDIO

AN/TNH-2 10" tape deck, luggable, good.....20
Fisher 90T AM-FM tuner/preamp, VG.....40
RCA Photophone amps. (2), 2A3s, good.....350

CRYSTAL SETS

British WE 44001 w/ phones, VG.....220
Canadian De Forest Everyman w/De F headset, good.....150
Champion, refin?.....90
HB w/RCA parts.....23
HB, nice '20s slide-coil, w/phones.....45
Kemper Clear-Tone slide-coil tuner added.....40
Patronic "tubeless" plastic, w/phones.....25
Philmore large, less xtal cover.....28
Philmore Little Wonder, in box.....60
Philmore, NIB.....90
Xtal-diode radio kit, in box, w/instructions.....20

LITERATURE

BOOKS

200 Meters & Down, 1936 ed., good.....12
200 Meters & Down, reprint, VG.....5
AK Dealer Parts & Service Manual, AC Sets — 1928 & up, VG.....40
Amateur Wireless Handy Book, '30s, good but less rear cover.....10
Applied Radio & TV training manuals (3), Radio & TV Institute.....5
Cavalcade of Broadcasting and Golden Years of Broadcasting, exc.....18
Cyclopedia of Applied Electricity, Vols. 2, 3, 4; Am. Tech. Soc., 1906.....5
Edison & His Inventions, Rose & McClure, 1889, less rear cover.....85
Edison Radio Service Manual, photocopy.....10
Experimental Television, Collins, 1932 (scan-disc TV), good.....60
F. A. D. Andrea neutrodyne kit instruction book w/ anel stencils, VG.....15
FM, Rider; and Here Is Television, Rider & Hutchinson; VG.....5
Genius at Riverhead, A Profile of Harold Beverage, Wallen, VG, jacket.....65
Heathkit novice-course binder.....5
Man of High Fidelity, Lessing, hardbound, repro jacket, VG.....50
Manual for RCA direction finder, '30s.....18
Measurements in Radio Engineering, Terman, VG.....18
Morse-code 78-rpm records (non-Marconi), w/book.....18
NRI correspondence course, 2 sets.....10
On the Air, Behind the Microphone, Edison, and The Talking Wire, VG.....30
Principles of Wireless Telegraphy, Pierce, 1910, signed by H. Beverage, good.....85
Principles Underlying Radio Communication, 1922 ed., VG.....12
Radio Amateur's Handbook, ARRL, 1967, exc.....8
Radio Boys (3): Flood Fighters, etc., no jackets, good.....20
Radio Serviceman's Handy Book, Gernsback, 1931.....38
Radio Troubleshooter's Handbook, Ghirardi.....10
Radiotron Designer's Handbook, 4th ed., good.....50
Rider's service binders:
TV Vol. 1, VG.....10
Vol. 7 (2) VG, NU cover, 5; exc.....11
Vols. 7, 10 & 11; plus misc. Photofacts.....10
Vol. 11, VG.....12
Vols. 11, 12, 13; VG.....15
Vol. 14, VG.....9
Talking on the Radio, Dunlap; Edison, Josephson; both good.....11
The Alternate Current Transformer, Theory & Practice, Fleming, vol. 2.....43
The Boys of the Wireless, Webster, 1912, less jacket, VG.....18
The Classic Valves, Ohtsuka, 1995, signed.....25
Tung-Sol tube manuals, four vols.....110
Vision by Radio, Jenkins, 1925, exc.....130
Wireless Telegraphy, Banguay, Vols. 1 & 2; You're On The Air, G. McNamee; VG.....35
Wireless Telegraphy, Fortescue, 1913, cover stained, else good.....23

CATALOGS

Atwater Kent, 1926, good.....25
Allied Radio, 1929 (their first), exc.....140
Allied Radio, 1931, exc.....95
American Radio Mfg. Co., 1925, VG.....18
Burstein-Applebee 1932-33, exc.....18
Crosley sales book, '37, all models, VG.....50
Hub Cycle Co. (Boston) radio, 1928, VG.....35
Lafayette, 1937, VG.....10
M & H radio, 1934, VG.....35
Marconi Apparatus, 1913; plus 1913 and 1919 Communication Laws of the U. S. (USGPO); all good.....450
Pilot Radio, 1929; Universal Microphones, 1933; both good.....15
Radio & Short Wave Treatise, 1931; Nubor Flashes (both catalogs).....8
Radio Guild 1925; Airex '31; RCA '35 metal-tube booklet; all good.....18
Sears radio '36-'37; plus Watt News, Dec. 1937; both exc.....14
Silver-Marshall, ca. 6, exc.....28

Continued on page 24

— AUCTION REPORT

Continued from page 23

Wards radio, '39 and '40.....5
WE 1000-W Broadcast Equipment.....10
WE 5000-W Broadcast Equipment.....10
Wireless adv. brochures, pre-1922, binder.....43

PERIODICALS

Amateur-radio mags, '60s & later, 2 bundles.....5
ARCA Gazette, 10" stack.....28
GE Review, '29 & '32, 2 issues, good.....30
QST Dec. 1915 (Vol. 1 No. 1), fair.....420
QST, 1923, all issues, VG.....33
QST, 1928, all issues, in binder.....35
QST, 1938-50, VG.....20
Radio & TV News, '50s, 6" stack, good.....13
Radio & TV News, 42 issues 1941-58, good.....20
Radio News of Canada, July 1924, fair.....28
Radio Progress, March 24; Technocracy Review, 1 1935 issue, both good.....15
Radio Retailing, 1 1932 issue; Radio Service, Dec. 29; both good.....12
Radio World, '30s issue; American Radio Defense, 1940; both good.....11
The Electric Journal, 4 issues, 1919, VG.....45
The Electric Journal, 5 issues, 1920, VG.....10
Wireless Age, Oct.-Sept. 1914 to Oct.-Sept. 15, bound.....60
73 magazine, 3½-foot stack.....23

KEYS & TELEGRAPH

American Electric service buzzer Model 1914, 1917 production, VG, w/headphone.....50

Bunnell

"Box relay" key-sounder, exc.....160
Full-sized key-on-base.....48
Pen register w/ tape, clean, VG.....350

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Ericsson 800 Morse/alarm register, all-brass (not glassed), w/ tape and copy of catalog.....1,700
Mk. I Euro-style key, chromed.....240

Hi-Mound

HK-1Z marble key, chromed.....200
FK-3 sideswiper key, marble on heavy base.....210

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Key and Bunnell sounder in resonator on oak board.....70
Merit "RAF Scouts" Morse signal kit, NIB.....210
Punched-tape Morse readers, 2 on board.....20
Roland polar relay, upright cylindrical brass case, flip-open glass top.....170
Signal Electric Co. small sounder.....16

Western Union

2-A legless key.....20
Full-size key-on-base, 120-ohm main-line sounder.....35
Full-sized KOB, marble.....48

MICROPHONES

Asst. comm-type, ca. 6: Astatic D-104 head, Calrad, mobile, etc.....25
Electro-Voice V-2, high-Z 44B-like, w/table stand.....310
Philips mic element, Reisz-type marble.....210
RCA 74, re-ribboned.....160
RCA 74B, works, w/stand, chromed.....375
Sanken MS-1 dynamic w/desk stand.....200
Toshiba type A velocity mic. in orig case, black 44B-old.....750
WE 630A "8-ball," w/cord.....170

MISCELLANEOUS

Bell "gallows" phone, repro of 1875 type.....475
Bodine table-type loop antenna, fair-good.....210
Can. Marconi ship first-aid cabinet — red-cross/maple-leaf logo.....45
Edison "Home" cylinder player, w/crane and dented polished-brass horn 10" dia. x 3', workingness unk.....400
Emco wood variometer, good.....10
Heathkit MI-11A depth sounder, orig. box.....16
J. F. Arnold loose coupler, "Navy style," VG (2).....180, 220
Morris coil winder w/book.....70
Parts rack, 18 jars, "RCA Electron Tubes," old logo.....23
Radio support table, "The Queen," 1925.....13
RCA hobby "Electronics Kit No. 1," old logo, NIB w/book.....45
RCA Victor cactus-needle cutter/sharpener.....35
Remler 700 Infradyne amp, NT, NIB, exc.....25
Spark coil, ca. 6", VG, working.....350
Spark coil, small Mesco-style, VG.....30
Taylor temperature chart recorder in glass case, good, spare charts.....33
Thordarson Type R spark xmfr, good.....95
Tuning cap., large, w/Clark Collection (Ford Museum) tags.....12
WE Audiphone hearing aid, carbon-mic (pre-electronic) model.....8
Small Wimshurst machine (10"), plated parts, VG.....170
Medium Wimshurst machine (12"), mica disc, dual Leyden jars, old, clean.....180
Lightning-demo salesman's aid for W. C. Shinn lightning rods, in oak glassed box, w/new milk-glass lightning-rod ball.....1,000

RADIOS - TUBE

Addison 5A Catalin, mint green, bottom repaired, 1 repro knob, nice.....240
Admiral '60s AM-FM table set, grubby.....1
Air Castle 751 wood table set, good.....18
Air King radio-phono, VG.....13
Airline 1-tuber, fair, tubes unk.....48
Airline 65-260, VG.....10

Atwater Kent

10C BB w/tubes, repro tags, VG....875
21 dry-cell set, exc....230
84, slice out of grille, otherwise VG....180

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Arborphone 1925 three-dialer w/inst....25
Arvin metal sets (3), good....53
Belltone wood AC-DC, VG....9
Can. Marconi 212 bklt, VG....20
Cathedraloids (3): Sparton, Gloritone, U. S. Radio; all VG....210

Clapp-Eastham

Baby Emerson, 1 rheostat replaced, VG....425
HR & HZ, NT, exc....575
HR, exc. (2)WT, 240; NT,....260
HR, w/ BBTWD-12, VG....150

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Columbia 3-tube 3-dialer, WT, VG, works....65

Crosley

127 10-tube table set, VG....110
4-29 w/tubes....150
51 and 52, each w/ good tubes; plus loose coupler, all VG....220
59 Repwood, VG....310
V, good....120
Grandfather clock, 2 speakers, workingness unk., needs grille cloth, else OK....320
Showboy Repwood tombstone, restored....90

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Day-Fan 7 w/built-in horn 20
Day-Fan table set & base, AC-powered 1-dialer, good, possibly less PS....55
De Forest Interpanel, six-unit/three-tube w/ honeycomb coils, w/tubes and orig. inst., audios ?, else VG, ex-AWA Museum, probably the one descr. in March '76 OTB....3,000

Emerson

520 Catalin, small chip on rear....85
AX-212, VG, wrong knobs....110
BJ-210, VG....25
FB-44 wood table....23
In Ingraham cabinet; plus Philco 46-213, both good....18

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Erla K-8, NT, VG....33

Federal

57, NT, VG....725
59, w/tubes, wkg, exc....1,150
110, no cabinet, tubes, or RFT, VG....140

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Freed-Eisemann NR-5, NT, VG....80
Freshman Masterpiece mini-console w/PS built in, w/tubes....65
Freshman Masterpiece Spkr. built-in, veneer problem....45
GE J-82 recapped/restored, exc....160
GE Model 62 clock radio, unk. cond....5
Gloritone 27 deco set, VG....95
Gloritone cathedral, good, unk....70

Grebe

CR-5, w/ tube, exc....1,300
CR-9, NT, rheostats need fix, else VG....180
CR-12, NT, VG....200

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Grundig 2028H, exc., works 30
Grundig 2201-U and Grundig hi-fi turntable 65

Home-built

1-tuber, early, very nice....30
1-tuber, built in wood jewel box, modern....33
2-tuber, uses Radiola coil, WT, nice....15
2-tuber w/Arcturus blues, no cabinet....28

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Kennedy 11, w/tube, VG....160
Leutz C-7 superhet, VG....500
Lyra three-dialer, VG, tubeness unk....45
Magic-Tone bottle radio, good....110
Majestic 20, VG....70
Mello-D 3-dialer, battery set, NT, good....45
Miraco 3-dialer, WT, needs refin, else nice....30
Monodyne one-tuber, w/dud tube, replica coil form, else VG....75
Motorola 67X2 bklt, VG....12
Motorola wood table set....15
National Air-O-Phone one-tuber, WT, VG....200
Neutrodyne kit three-dialer, 1924, NT, VG....20
Operadio Model 2, NT, VG....250
Paragon Model 3 3-tuber, WT, exc....190

Philco

20 Deluxe cathedral, good....210
44 console, VG, works....40
66 Deco, workingness unk, VG....38
66A, reworked, good....70
71 cathedral, VG, workingness unk....160
1939 chairside radio-phono, VG....35
37-60, good....60
37-84, fair....45
38-116 console, no knobs, cloth OK, veneer solid, needs refin....10
41-221, exc....25
42-142 portable, VG....8
47-421, good....5
Chairside ex-car-radio (C912?), VG....55
Deco set, needs cloth & cord, workingness unk., VG....23
Pilot cathedral, exc....400

RCA Radiola

18, VG, wkg....38
20 w/tubes & 100A spkr, VG....180
II chassis, some spare parts....55
III, no battery cord or tubes, else VG....30
III w/tubes, works, VG....80
18 & 100A spkr, less dial hood, else VG, working....85

Continued on page 26

— AUCTION REPORT

Continued from page 25

26 w/battery box, WT, workingness unk.....500
Balanced Amp. for Radiola III, w/ dud tubes, one bad audio, slice out of case, else VG.....160

RCA Victor

117 tombstone, small veneer damage, else VG.....28
3BX671, Trans-Oceanic-like, VG.....40
Radio-phono consoles, ca. 1930, ex-Museum (3) Needs refin.....13; good, 35; VG, 110

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Regency World Traveler rcvr., VG.....20
Rogers (Can. Majestic) cathedraloid, VG.....100
Rogers (Can. Majestic) R-250, Kellogg-style tubes, good.....160
Siemens K32GWB WW II morale set, fair.....320
Smokerette radio, VG.....140
Stewart-Warner wood table set, prewar, VG.....170
Stromberg-Carlson 1101H and 1500, wkg but one less dial & knobs.....14
Stromberg-Carlson 1500H bklt, NIB.....65
T. Eaton Co. (Electrohome, Can.) movie-dial table set, VG.....125
Tuska Superdyne Junior, w/tubes, exc.....210
United Motors Service 404F mantel set, VG.....28

Westinghouse

AR RF amp. for RA-DA, NT, exc.....725
RA tuner (RC less audio side), good.....40
RA-DA, w/tubes, 1 open audio, else VG.....200

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Wards 83WG901A console, ca. 1939, fair.....5

Zenith

4-R, w/tubes, audios open?, else exc.....775
5E002 and 5G003 bakelites, VG.....15
6S229, exc., wkg.....210
7H820 AM-FM, both FM bands, VG.....30
Portable, '40s Black Stag.....14
Trans-Oceanic, '50s round-dial model, less 2 knobs, else VG.....21
Trans-Oceanic, Y600, VG, works.....55

RADIOS - TRANSISTOR

Bicycle radio, 2-xstr, NIB.....100
Canadian Marconi 2002 w/case, earpiece, & box, orig. $49.95 price label.....90
Philips kit (2-xstr?), untouched, NIB.....43
Raytheon T-2500, good, small dent in grille.....50
RCA WE-93A "Dynamic Demonstrator," exc.....105
Solar-EAM-FM.....13
Zenith Royal 500, wkg., VG.....33
Zenith Royal 2000 Trans-Oceanic, exc.....65

SPEAKERS, HEADSETS

Airline horn, clean, works.....80
Amplion AB-6 cone, ca. 15" high, VG.....30
Baldwin C headset.....15
Brown Mfg. tortoise-shell spkr, tiny - 2.5" dia, 5" high.....210
Crosley Musicone, lightly wrinkled, else good, works.....40
Headsets, ca. 12 '20s types.....28
Headsets, 26, 16 of them good.....130
Headsets, 20 single-type.....15
Jewett Super-Speaker horn, fair.....85
Magnavox horn (R-3B?), both coils good.....85
Miller Rubber Co. horn, good driver.....95
Music Master mahogany horn, good.....190
Peerless socket-power, 15" high, 12" wide.....40
Peerless, works, needs minor cloth fix.....35
RCA Radiola 103, good but small hole in tapestry, works.....45
Songbird all-nickeled horn, somewhat like W Vocarola, wall-plaque mounting.....100
Sterling "Dinkie" horn, 6" bell, w/original box, VG.....700
Tower "Adventurer" ship cone, VG, works.....500
WE 10D horn, minor repairs, VG.....110

TEST GEAR

Boonton Q-meter, early (pre-100A?).....23
Cossor Telecheck 1230 sig. gen.....10
Federal Television TV-2A tube tester, six meters, VG, case repainted.....280
Firth Model I wavemeter, VG.....13

General Radio

222LS prec. condenser in carry case, exc.....23
583-A output power meter, exc.....25
Decade resistor, 5-switch.....10
Tube bridge, one socket, VG.....53
VTVM, prewar sloping-front, good.....18
Wavemeter w/coils & shipping case.....30
Wavemeter w/coils, no crate.....32

— — —

Gray portable Wheatstone bridge ("galvanometer"), very nice.....35
Hitachi bench-style lab meter, WW II.....20
James Bill Co. - Frahm portable reed freq. meters (3), 400 & 800 Hz.....45
Japanese megger in carry case.....60
Leeds & Northrup inductance bridge, VG.....10
Marconi of Italy quenched-gap test xmtr., "modern," less case.....130
Megger, wood.....35
National CRM 1" scope, VG.....53
Read-Rite tube tester, '20s triple-meter, VG.....25
H. H. Scott 830 multiplex generator.....35
Standard-cell lab calibrator/comparator.....5
Tangent galvanometer, ca. 5", VG.....43
Thompson-Levering res. bridge, VG (2).....13, 13
Three-way portable tester, VOM & sig. gen.....18
WE 14B rheostat, for 1B impedance bridge.....25
WE 14B rheostat, plus 2-A Inductance.....35
Weston DC ammeter, lab bench type.....16

TUBES

BY BRAND

Amperex HF-120, BB, unk. cond.....12
Amrad "S", S16 style, w/ ceramic socket.....25

Arcturus blue

(12) - 36, 124, 126, 127, etc., good....120
(14), heaters OK....80
127, good....10
26, 27, unk. cond....15
45s, pair, good....80

— — —

Can. GE 815 and 920....5
Can. W UX-199, NIB (2)....50
Cunningham Audiotron "pickle" tube, good (2 lots)....95; in UX adapter, 90
Cunningham UX-199 (3), crisp boxes, unk. cond...38

De Forest

D-01A w/ can, good....80
DV-2 w/ can, good....70
DV-3 (2), fils. OK....40
H, glass chips inside, unknown cond....270
Spherical audion, 1 fil. good....1,100

— — —

Eimac 304TLs, used, unk. cond., plus two RCA "world" boxes....10
Electrad diode w/socket....35
Erla X-12A, and De F 424, good....14
Eurekatron, BBT, good....28
Executone 6550s (2), used, good....23
Majestic spray-shielded, Can., ca. 10....15
Marathon AC-608 (5), all good....130
Marconi-De F audion, BBT, open....38
Myers RAC (2)good w/socket, 70; open....43
National Union 350Bs (6)....110

Northern Electric

216A, good....45
221D (3), good....48
DX-221, good....35
RX-235 (pair), good....10
QRS Red-Top, NIB, w/paper....50

RCA

2AP1, new in "world" box....10
2A3 (5), NIB....260
50, ST bulb, NIB....110
203As (2), alum. base, crisp "world" boxes....30
224, 227 (4), new in crisp '20s boxes....25
813s (2), in boxes, good....13
860, nice but unk. cond....23
1608 (3), NIB....80
1848 (?) iconoscope, 5", octal base....240
1850A iconoscope, w/GE box....210
8005 (2), NIB....70
UV-201A, BBT, pretty "rainbow," good emission...40
UV-849, aluminum base, good....33
UV-851, aluminum base, good....270
UX-199 (3), good, crisp boxes....35
WD-11, BB, NIB....80
Store-display neon, cond. unk....105

— — —

Rogers R-30, good....10
Speed (Cable) 296 "Triple Twin," good....50
Tung-Sol 705As, NIB....5

Westinghouse

Klystron, sim. to SRL-7, on display base....20
WL-195, good....10
WL-706 magnetron....30
WR-21 in box, good....190

Western Electric

1A photocell in orig. can....110
2A photocell, one lead off....48
201A (not "industry" 201A!), good....180
205B, 205D, and 205E, good fils....110
205D (2), good....260
215A (5), plus 3 sockets, good....160
216A (3), two OK....125
216A, good (3 lots of 1)....60, 60, 60
216A, unk. cond....60
216As (3), good....140
216As (5), good....160
224B CRT, good....150
444A & 463A TWTs, good htrs....40
717A (2), NIB....13
720CY magnetron, NIB....43
730A and 2J50 magnetrons, NIB....110
2J50 magnetron, NIB....50
D-86326 (= 101D), NIB....20
VT-1, NIB, less tips....60

GENERAL

2A3 (2), good....120
4X150A (4), unk. cond....6
5Z3 (3), NIB....13
26 (4), 44, unk. cond....10
27s (5), , good S-bulb, 23; ST-bulb....6
UV-200, BBT (2); UX-201A, BBT; De F D-01A....63
200, 201As, all BBT (4): good, fair, shorted, and dud resp....45
201s (2), 200 - 2 good....20
210s (2), one new, one used....43
299 (5), 120, good, plus dud VT-2....50
50-watter, BBT (CG-1144?), gassy?, fil. OK....10
803s (2), good w/sockets....5
805, 838, VT-266 (805) open....30
UV-199 (2), UX-199 (2), all good....40
UV-207, open....45
UX-199, UV-199 (2), crisp '20s boxes, unk. cond....30
WD-11s (2), tipped, bklt. bases, good....70
Audiotron, 1 fil. good....85
Audiotron, good....170
Crookes "mineral" CRT, repro, vertical on wood base....225
Crookes Maltese-Cross CRT, works....300
Disc-TV neon (De Forest 601?), dud....75
Nixie readouts, 20, mixed styles....23
Weagant valve, unk. cond....300

FOREIGN TYPES

Box lot (5): Stabilovolt, EF39, ECH11, etc....45
Box lot, early radar (20): CV85, CV92, CV90, CV116, CV1484, etc.; plus some US....160

Continued on page 28

— AUCTION REPORT

Continued from page 27

CV-1226 short silica valve (Brit.) and French TM-30, good....170
E4M Métal (French WW I), used....850
Everready (Brit.), 12 NIB, good....55
Genelex KT-66 (4), good, in orig. boxes....210
Genelex KT-88 (2), used, "excellent"....110
Marconi-Osram V24, good 100
Osram sim. to DEQ, plus Myers RAC3, Osram 2292....160

BOX LOTS

Beer-flat, xmtg., "as found"....5
Beer-flat, xmtg., 6336, silicon plug-in rects., etc., "as found"....5
Beer-flat, xmtg.: 805s etc., "as found"....13
Beer-flat, xmtg.: 876, 814, 829, etc., "as found"....5
Beer-flats (3), xmtg, incl. KY-21, ca. 100....13

CROSLEY IS AMERICAN HISTORY

1920 Introduced first low priced radio.
1922 Largest radio manufacturer in the world.
1923 Radio station reached 500,000 watts
1929 Designed own airplane
1930 First car radio called the "Roamio"
1933 Introduced patented Shelves in the Refrigerator Door - Shelvador!
1939 Introduced the first small car.
1939 Started TV broadcasting (WLW)
1940 Introduced the fax machine.
1946 First TV station began telecasting.
1947 Broadcast first baseball game.
1948 WLW-TV is first NBC-TV affiliate
1954 Pioneered first portable TV.
1957 WLW began telecasting color TV.
1972 WLW-TV Crosley Broadcasting consisted of 5 TV & 6 radio stations
1976 The new Shelvador re-entered the industry.
1977 Crosley Corp. purchased all rights to Crosley from AVCO.
1978 Introduced a complete line of major appliances and electronics
1990s Crosley Hi-Tech TV made in the U.S.A.!

Alan Douglas (Box 225, Pocasset, MA 02559) challenges readers to identify the four correct entries dated prior to 1960. Write him directly; he started this and will have to deal with the outcome! Eventually he may contact us again and explain which were erroneous.

Big-pin, ca. 80, tested OK....20
Big-pin, 13, incl. S-bulb 01A and several 45s, unk. cond....110
Big-pin, 34 misc....15
Big-pin, 100, sealed, good....40
Big-pin, 150, "mostly tested & good"....60
Big-pin, S-bulb (6): 80, 47, etc., unk. cond....23
Light bulbs, one tipped, one DCC-based, three "S"-bulbed....35
Loktals, 250 good....13
Octals, 80 tested/reboxed....15
Octals, 75, sealed lot....12
Octals, 175, sealed lot....9
Octals, 250, sealed lot....13
Octals, metal, 175, sealed lot....28
Octals, etc., raw (3 lots)....9, 10, 10
Octal-size, 250 NIB....30
Miniature, raw, 250....33
Miniature, sealed....3,258
Miniature, sealed, ca. 0.3 cu. ft....5
Sweep, 30, mostly 6-volt, NIB....10
Sweep, mainly 6-volt, ca. 140, NIB....8
Sweep, mainly 21 volts and up, ca. 140, NIB....5
Tungars (3, NIB), four misc, unk. cond....33
TV types, boxed, ca. 80....8
Xmtg: 4PR60, 811s, etc....18
Xmtg. duds (13): WE 212E in orig. box, 371Bs, 5894, 4-250A, etc....10
201, 200, WE 239A, GE thermocouple, BB, good....50
NE 201D, WD-12, De F DV-3, all open....25
T-40, 8025, CV18, etc., 5 total....12
VT-2, Arcturus 127, 250, others, "good"....33
WE 205F NIB, VT-25, Duovac 112 NIB....75
Caddy, GE, w/ 175+ good....18
Caddy, Tung-sol, w/180 used....5
Caddy, Zenith "bicentennial," w/ sweep tubes....5
Group of seven boxes....20

TELEVISION

Bush TV-22, 9" British bakelite, 405-line, conv. to 625-line, VG, book....500
Panasonic camera w/monitor, pro/indust....35
Philco Predicta horiz.-style, pair, fair, 1 less back, tubes OK on one....390
RCA 8TS30, scruffy, less cover....30

"WIRELESS"

*CM-401 & CM-405 direction-finder panels, Am. Marconi, no case....120
*CW-938 radiophone, WE, w/tubes and shipping box....2,300
*SCR-59 aircraft rcvr, WE, NT, VG....1,500
*SCR-71 "T. P. S." xmtr ("power buzzer"), Conn. Tel. & Elec., VG....300

THE EVOLUTION OF THE AUTO RADIO — PART 2

By Hank Olson, W6GXN
Silent Key — March 9, 1996

Note: Part 1 of this article appeared in the previous issue (August 1996) of the OTB. *Source numbers are continued from Part 1.*

POWERING EARLY SETS

Six-volt, tube-type auto radios typically used either a 15 amp, 3 AG fuse or a 14 amp, 8 AG type; reflecting the huge current requirements of these early radios. Sitting for a few hours with one's girl friend in some lovers' lane with the auto radio on (even softly), usually meant that one had an unscheduled walk home, or a late night call from the local AAA service truck.

To help reduce the current requirements of these early auto radios, some designs used OZ4 cold cathode rectifier tubes (descendants of the much earlier Raytheon BA and BH) or a synchronous vibrator. This practice reduced the overall current drawn by the radio, but both OZ4s and synchronous vibrators were relatively short-lived.

The OZ4, fortunately, had the same general pin connection as the 6X5 (except for the heater leads) and in many radios the wiring allowed for either to be used. WWII helped make OZ4s available for service work; the OZ4 was made under the mil nomenclature 1003 (metal envelope only).

The synchronous vibrators (having one set of points for chopping the primary DC and a second set of points for rectifying the HV-DC) were expensive, and vulnerable to more failures than the single non-synchronous vibrator. Replacing a synchronous vibrator today, is an expensive and difficult shopping search.

Synchronous vibrator-equipped auto radios had another annoying drawback: a radio wired for a negative ground car would not work in a positive ground car and vice-versa, unless one set of vibrator points was reversed. Changing the phasing of the vibrator points is not too difficult once the set is out of the car and on the work bench, but this feature has probably mystified many a shade-tree mechanic who tried to put a Chevy radio in his old Ford (or vice-versa).

Operating a synchronous vibrator type auto radio on the wrong polarity battery voltage could destroy the vibrator and/or the filter capacitors, unless the 15 amp primary fuse opened first.

All vibrator type car-radios have another engaging habit. If one is operating the radio with the engine not running (which is a self-limiting process, as the battery will be dead in a few hours), and then one starts the engine with the radio "on," damage will often occur to the vibrator.

The starter current lowers the radio input voltage, and sometimes this is enough to make a vibrator point "stick" or cold-weld. This feature is why many auto ignition switches have a lock-out arrangement to turn off the radio during the starting sequence. Auto radios damaged by reversing polarity of the DC input, or by starting the car while the radio was playing, often ended up in the service shop where I worked while I was a student.

In order for a car radio to be accepted for service, the customer had to accept the idea that if the vibrator was faulty, he also would have to pay for replacement of the buffer capacitor (the .002 to .01 mfd, 1,600 volt capacitor across the HV secondary of the vibrator transformer). This was to prevent callbacks; if the vibrator was bad, the buffer capacitor could be the cause.

It was considered prudent to replace the buffer as a precautionary measure; if defective, it would it take out a new replacement vibrator. Replacement of this capacitor was not always an easy task, as it was usually inside a metal-shielded compartment of the auto radio. At first, this capacitor was generally a 1,600 v paper tubular type, but became a "plastic" unit after World War II and, towards the end of the vibrator power-supply auto radio period, became a ceramic disc type.

MILITARY LOW VOLTAGE SETS

The distinctive feature of the hybrid auto radios of the late 1950s is that the tubes used low (12.6 V) battery voltage on their plates, along with a transistor AF output stage also operating directly on battery voltage.

The concept of a vehicular receiver that uses no DC/DC converter, and operates the tubes directly on the vehicle's battery voltage, seems to have first been tried during WW II. Of course, transistors were not even dreamed of, that early, so other technology had to be used in the AF output stage.

The BC 1206 was a 200-400 kHz receiver intended for reception of LF weather and "range" stations. (6) (7). The set used four 12 volt heater loctal tubes with their heaters wired in series/parallel, so as to operate on the +24 volt bus of most military aircraft. The heater of the fifth loctal, a special dual beam audio output tube designated 28D7, operated directly across the bus.

Operating with both sections wired in parallel, the 28D7 would draw enough plate current at +24 to

Continued on page 30

— AUTO RADIO — PART 2

Continued from page 29

+28 volts, that it was possible to get about one-quarter watt of audio output (enough for earphones as required in aircraft operations).

Later, during the same period in which the hybrid auto radio was being produced, the military also made a couple of H.F. communications receivers using low voltage plate tubes: R-392/URR (part of AN/GRC 19) and R-808/URR (Part of AN/GRC 14). The R-392 used a 26E7 special output tube. It was similar to the 28D7, but was a dual pentode rather than a dual-beam tube and had an octal base. The R-808 was more like the hybrid auto radios, using a pair of 2N340 transistors in its AF output.

Both of these HF communication receivers operated directly on +24 to +28 volts. Like the auto radio hybrids, they were soon to be made obsolete by newer all-transistorized designs.

EARLY FM AUTO SETS

Generally, there were no FM auto radios prior to WW II, since the 88-108 mHz broadcast FM band had not even been established yet. Perhaps a few special FM auto radios had been built to demonstrate the advantages of Armstrong's older 42 to 50 mHz FM broadcast system, but these were certainly not common. 42 to 50 mHz FM receivers usually had 4.3 mHz IFs, and became obsolete on January 16, 1945, when the FCC changed the FM broadcast band, initially to 84-102 mHz.

The new FM band in the 100 mHz vicinity meant that all pre-war broadcast FM transmitters and FM receivers were obsolete, but the change did more than double the number of available FM channels. This post-WW II frequency reassignment also included changing the old amateur 56-60 mHz (5 meter) band to 50-54 mHz, changing the 2.5 meter ham band (112-116 mHz) to 144-148 mHz, deleting TV channel 1, and establishing TV channels 2 through 13. This was a VHF shuffle of major proportions, with a large number of special-interest users all vying for influence on the ultimate assignments.

In the U.S. there was no rush to include FM broadcast in auto radios. In fact, the new 100 mHz FM band was initially a vast wasteland, with the few broadcasters talking to a non-existent audience. During the early 1950s in the San Francisco Bay area, I can recall tuning across the FM band (with a pre-war Stromberg-Carlson 42-50 mHz FM tuner to which I'd added a 1N21/955 converter), and hearing only about a half-dozen stations. Fighting for survival, many of them offered to sell listeners FM tuners at station cost: about $20.

If one wanted an auto receiver with the 88-108 mHz band (few did) in the late 1950s, one either got a Becke or a Blaupunct (both German-made and of conventional tube design with HV vibrator supplies). Another option was an "add on" FM tuner or remodulator such as those made for Lincoln by Bendix, or by Gonset (known mostly for ham-gear) as an after-market accessory. All of these FM designs used tubes, since the state of the transistor art was far short of capability for 88-108 mHz, as the decade of the 1950s closed.

The Lincoln 88BH (FFC-15491-B) tuner is interesting because it uses conventional HV-type tubes (12AT7s and 12AU6s) operating from an 80 v DC/DC converter of the blocking-oscillator type with one 2N419 transistor. The Gonset 3239 uses LV plate tubes (12EC8, 12EK6s, 12AD6) and a 12AL5 discrimator. It detects a signal on the 88-108 mHz band, then amplitude-modulates the detected audio from this signal at about 800KHz in the AM-BC band.

There was no great interest in adding FM to the average auto radio until the number of FM broadcast stations finally began increasing in the early 1960s. The onset of FM capability in auto radios more-or-less coincides with conversion to transistorized circuitry. However, the (germanium) transistors of the late 1950s were much worse at 100 mHz than readily-available miniature tubes. Even a 6J6 tube, dating from WW II, would easily out-perform the best of RCA's germanium drift-transistor of the 1950s — the 2N384 — at the top end of the new FM band.

If transistorized car radios were ever going to offer both AM and FM, better transistors would have to be designed. As might be expected, these improved transistors came from companies with a serious interest in making FM auto radios. Philco produced the germanium Micro Alloy Diffused Transistor (MADT) family, the first member of which was the 2N495. Motorola produced the germanium MESA transistor, an early example of which was the 2N695. The germanium MADT and MESA transistors offered exciting prospects to the FM (and TV) front-end industry as the decade of the 1950s came to a close.

But even these newer germanium technologies, as advanced as they were, would soon be obsolete. The first silicon epitaxial transistor, the 2N696, was introduced by Fairchild, an upstart company in the San Francisco Bay area. It would soon dominate VHF transistor circuitry, lead the way to obsoleting the whole germanium transistor industry and open the future to Silicon Integrated Circuits.

SOURCES

(5) Howard W. Sams, *Auto Radio Service Data Manual* Vol. 6, (AR-6), pp. 157-160

(6) Grayson, K.B., "Surplus Schematics Handbook" *CQ Technical Series,* 1960, p. 49

(7) Olson, H., "Modifying the BC1206," *73 Magazine,* June 1968, p. 14

— LETTERS TO THE EDITOR

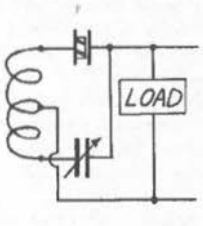
Continued from page 11

ing in a good humor, I will forgive the editor the hilarious mislegends of Fig. 2 on *OTB* page 26. Having programmed for computers since 1965, I naturally think I have generated most kinds of snarl-up; but it's clear that handshaking while text handling is going to bug every new generation of users. Looks like scanner resolution is also a headache sometimes, as on p. 51 and 62; OK, it's nice to have a few halftones between the blacks and whites; but not at too great a sacrifice in resolution. . .

Desmond Thackeray
Surrey, UK

A properly reproduced version of Fig. 2 accompanies this column, and our sincere apologies to author Thackeray. It seems that our computer was indeed not communicating properly with our printer's computer when Fig. 2 was being transferred, and somehow the error crept in after the proofs were checked. There was a similar problem with the reproduction of the two photos on pages 51 and 62. The switch to electronic publishing, necessary to control soaring printing costs (see Editorial), has not been without its glitches. But we hope that we now have the problems sufficiently under control so that future errors will at least be a little more subtle!

— Ed.



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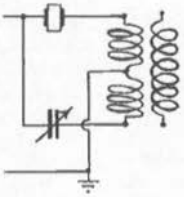
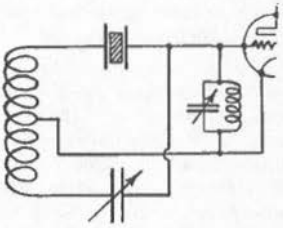
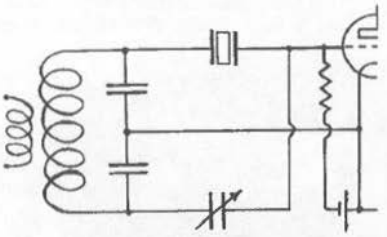


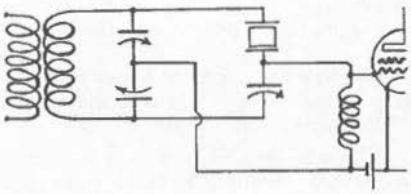
W.A. Marrison



C.W. Hansell



J. Robinson



J.J. Lamb

COVER PHOTO

Those who attended the Historical Banquet at our 1996 Annual Conference will need no explanation of this photo. For those who didn't attend, the charmer with the all-day-sucker is Mia Filippetti--a member of the talented Elmira Little Theatre Troupe that entertained at the event. You are looking at Mia in her role as the title character in a remarkable recreation of scenes from the "Baby Snooks" radio show. In another part of the program Mia and two other members of the Company, performing as "The Boogie Woogie Girls," evoked smiles (and some tears) with their haunting rendition of World-War-II era vocal numbers made famous by The Andrews Sisters. (Photo by Bruce Roloson)

CORRECTIONS TO THE AWA REVIEW, VOL. 10

1. The zip code on the letterhead on p. 2 should be 14469.

2. On page 241 the pictures for the Collins 10J and 4A transmitters were inadvertently transposed during the printing process. This is apparent by an inspection of Fig. 14 on the following page. Our apologies to author Heinemann.

3. Finally, credit should be given to Ludwell Sibley, a former editor of The AWA Review, for preliminary editing work on the Floyd Paul paper on Gilfillan Bros. Our thanks for his contribution and our apologies for the omission.

MYSTERY PHOTO ANSWERS

Let's start with the photo from May. Nobody had identified that very unusual looking set by the time August went to print, but now we have two slightly different answers. . .

Regarding the May mystery photo.....that's Caperton's "Magnaformer Super" from the fall, 1975 AWA contest. No idea who owns it now.....Of course I dislike it because it beat out my entry (and Lauren's, which is probably why he had a photo of it).

— Alan Douglas, Pocasset, MA

The set is a "Radio Receptor," eight tube superhet which was sold in kit form in 1924 by Victor Greiff, author of "The Super-Heterodyne Manual".....It is beautifully constructed and has such amenities as a built-in clock and panel lights which utilize DeForest audion sockets.....I believe the set was rescued from a barn in the 1970's by Jim Kreuzer.....It was next owned by John Caperton. The May OTB photo is from the 1981 AWA Old Equipment Contest by John.....I acquired the set from him around 1990. It was again displayed in the Old Equipment Contest in 1991 so others could have the chance to see such a unique set.

— Ernie Hite, WB4KFL, Rock Hill, SC

Now let's take care of the August photo! Following are excerpts from a letter to Bruce Kelley, AWA Museum Curator.

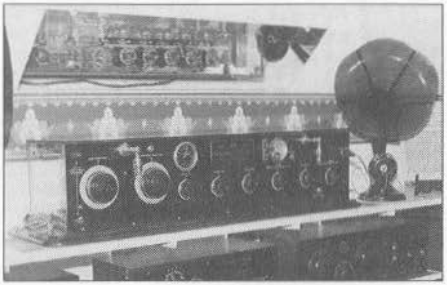
...There is, of course, no mystery at all to you or me as to the identity of the people in the photograph or the occasion which brought this group together. The whole AWA membership will probably identify you on the left, but fewer will be sure...of the man on the extreme right and the four very distinguished radio pioneers in the middle of the group.

The occasion of the Mystery Photo was so-called Pioneer's Night at the November 5, 1959 meeting of the Syracuse Section of the Institute of Radio Engineers. The four pioneer guests are, from left to right in the mystery photo, Raymond Heising, Alfred Goldsmith, Haraden Pratt and William White.....

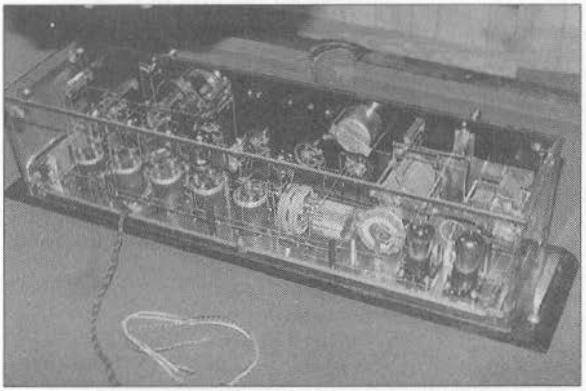
...Since I was Chairman of the Syracuse I.R.E. Section at that time, I was considerably involved in planning and conducting the Pioneer's Night program. You may recall that Dr. Goldsmith took advantage of this occasion to present Dr. W.R.G. Baker, then a retired GE vice president, with the David Sarnoff Gold Medal for "meritorious achievement in television engineering." This was a most memorable occasion for me and, perhaps, you, too, Bruce.

— Donald E. Maxwell, Syracuse, NY

Thanks to Alan Douglas, who also correctly identified the occasion, we add that the man on the extreme right is Linc Cundall. Linc, now a silent key, was a founding member of the AWA and the builder of the remarkable United Wireless Type D Tuner replica shown as our February 1996 Mystery Photo.



A corner of Ernie Hite's display room featuring the May, 1996 "mystery radio."



Here's a glimpse of the back of the "mystery' set, showing its original custom-built glass cabinet.

THE VACUUM TUBE

EDITED BY
Bro. Patrick Dowd, F.S.C., W2GK
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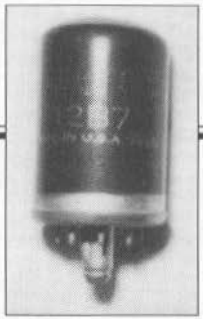


G.E.'S 12B7 BLUE-METAL LOCTAL TUBE

Some years ago, while researching the metal tube, I had the privilege of corresponding, at length, with James E. Beggs of G.E., retired. Among his many contributions was his involvement in the production of the first metal receiving tube (1933) and later in the development of the G.E. series of micro-ceramic uhf planar tubes (1956). All the quotations cited below are taken directly from Beggs' correspondence.

We might recall that G.E. had developed the metal tube to spark their reentry into the receiver and receiving tube business in 1935 after an absence of five years. This was made possible by the Consent Decree of Nov. 21, 1932.

"By late 1934 a series of ten metal tube types had been developed which were ready to go into production for G.E.'s Radio Receiver Department. However, it was the policy of this department to have at least two suppliers for all components. At this point G.E. approached RCA to see if they were interested in making metal tubes. RCA sent their key engineers to Nela Park, OH, to observe the metal tube manufacturing operation. Following this visit, RCA made an offer that G.E. found highly acceptable. They would pay G.E. a sizable cash stipend for the manufacturing know-how and supply tubes at a favorable price."

"After this, G.E. continued to do development work, not for RCA, but in an effort to make a sufficient contribution to justify their return to the receiving tube business. This work eventually led to the development of the 12B7 tube, the lighthouse types and microwave tubes such as the 6299, 6BY7 and 7077 types."

I had received a sample of a G.E. blue-metal loctal tube, type 12B7. In response to my query about this unusual tube Beggs stated that:

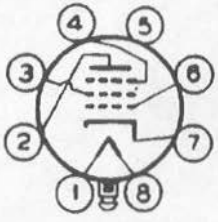
"The blue tube (U.S. patents #2,344,280, #2,254,727, and #2,229,436) was developed to provide a low cost metal tube. The loctal base was an integral part of the tube. The shell was pressed from SAE 1010 steel with steel pins sealed in a glass header (base). The special glass was developed by Dr. Louis Navias of the G.E. Research Lab. The tube employed no exhaust tubulation. It was evacuated in a bell-jar with the steel shell suspended above the base until near the end of the exhaust cycle. Then it was lowered into a well of molten solder at the bottom of the bell-jar and the shell was soldered directly to the base. A wafer, with attached keyway, was slipped over the pins and soldered directly to the header to provide easy insertion into the socket. The steel pins through the header served as the base pins. This resulted in a much lighter and shorter tube (2¼" overall length by 1⅛" wide) and eliminated the need to solder the lead-in wires into the normal base pins (U.S. patent # 2,174,682)."

"U.S. entry into WW II caused the work on the 12B7 to be terminated in favor of the 2C39, 2C40, 2C43, microwave types developed for the U.S. military."

The 12B7 is a remote-cutoff pentode and is equivalent to the 7A7 and the 14A7 tubes.

Basing Designation for BOTTOM VIEW . . . . . .

Pin 1 – Heater
Pin 2 – Plate
Pin 3 – Grid No.2
Pin 4 – Grid No.3
Pin 5 – Internal Shield



Pin 6 – Grid No.1
Pin 7 – Cathode
Pin 8 – Heater
Plug – Base Shell

Basing diagram and internal connections of the 12B7.

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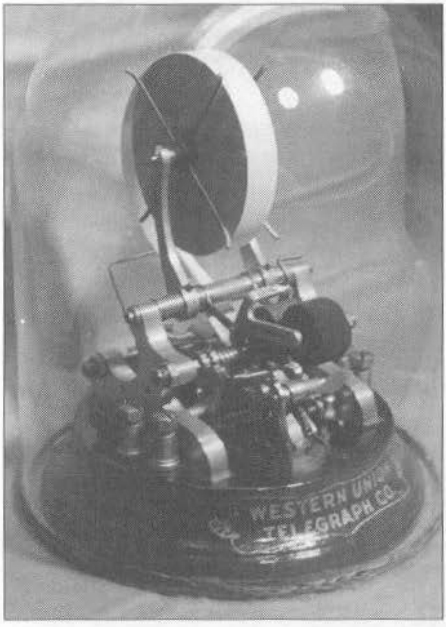
TICKLING THE IVORIES AT 40 WPM

Stock tickers seem to appeal to both serious collectors of instruments and those seeking only conversation pieces for their desks. (The latter group, incidentally, is probably responsible for the very high prices tickers command.) They are fairly complicated instruments, simply because of the synchronization requirements to be met on a pair or two of land lines, and the need to provide some kind of an automatic paper feed. The complexity of printing telegraph instruments led Donald McNicol, certainly one of the leading authors of early 20th century telegraphic textbooks, to describe printing telegraphs as capable of being understood only by their inventors.

The casual ticker owner may be curious enough to ask what makes it go. Inquiries about the "sending" end are often based on the assumption that a ticker somehow translates ordinary key-sent dots and dashes into letters and figures. Most collectors, however, are astute enough to realize that the transmitting end has to have means of generating synchronized pulses to cause typewheels to revolve to the proper position and to print the desired character. The very few ticker transmitters surviving are indeed complex instruments, and while they may not have the appeal of a well designed key, for example, they in their own way serve as excellent examples of the advanced telegraphic engineering of the period.



The "Universal" type ticker driven by the transmitter discussed in this article.

My wife has a good eye for early instruments, but when she saw me starting restoration work on the ticker transmitter shown here, she thought I had found an early version of the popular portable keyboards available today. The keys are ivory, but that's where the comparison ends. The black keys, incidentally, were just what some mice long ago needed to gnaw on; they managed to strip off most of the letter/figure identification. This ticker transmitter was used to drive the 3-A "Universal" ticker series, also shown. These tickers were known as step-by-step tickers; the tickers with a narrower, taller cast iron base (the type of stock ticker typically shown in the popular media in one context or another) were self-winding tickers, but both were driven by similar transmitters.

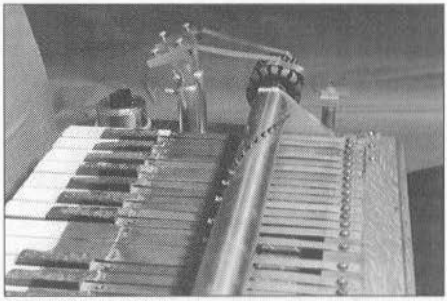
We won't undertake a thorough description of the workings of this transmitter, but briefly the constant speed motor turns a cylinder that has 30 small steel pegs arranged spirally along its length. Two contact wheels (resembling commutators) with 15 and 30 segments are mounted at the end of the shaft. The revolving wheels cause a pulsating current to be sent through a relay to the ticker's "type" magnet. When a key is depressed, the action stops the cylinder, the ticker's typewheel stops at the selected character, and a slightly longer pulse is sent through the contacts on the wheels. (A friction drive enables the motor to keep running.) The longer pulse causes the ticker's "press" magnet to operate, pressing the printing pad against a typewheel. Shifting between the "letters" and the "figures" typewheels is controlled by the so-labeled keys on the transmitter. Synchronization is automatically assured by a unison worm on the typeshaft, controlled by a key on the transmit-

ter; after two revolutions, the typewheels are aligned with the transmitter's cylinder. The paper tape is advanced as the press magnet action takes place.

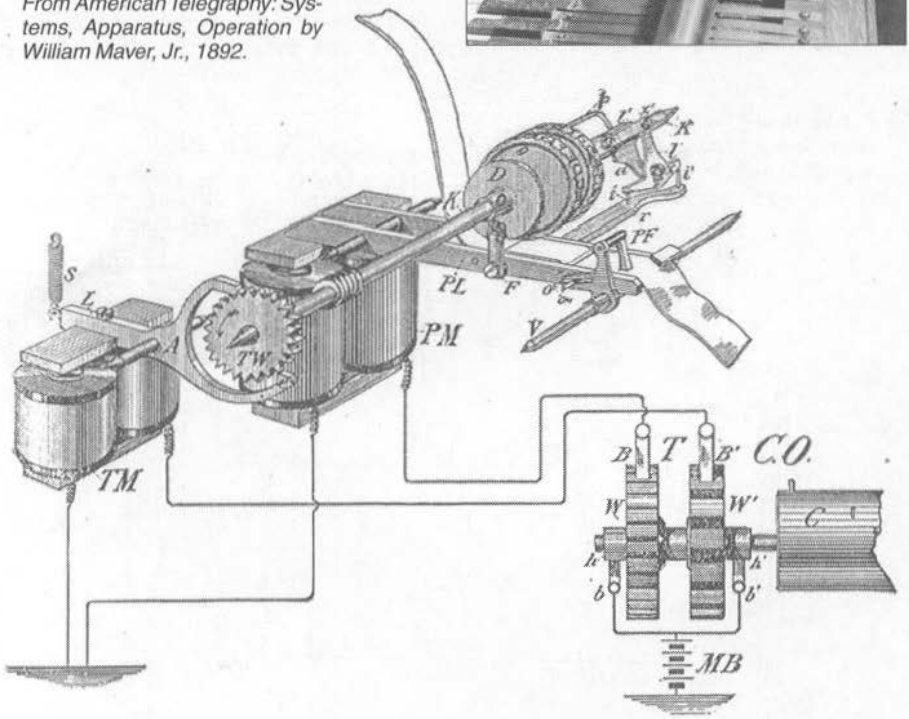
Maver's diagram of the process shows the ticker's magnets and the transmitter's segmented wheels. In some ways, the arrangement seems quite complicated, but in practice it worked very well for many years. Through repeating relays and reasonable care in balancing lines, one central office transmitter could drive dozens of tickers over distances of 200 to 300 miles. Universal tickers could even be operated over very long distances on one pair of lines using polar and neutral relays.

We've never seen an operator using a keyboard, but the scene must have resembled a concert pianist run amuck when the market went to hell. The canted bracket above the keyboard was undoubtedly a tape guide to verify what was transmitted. What with the unguarded motor, exposed gear train, and revolving wheels, the operation of these transmitters would give a present-day OSHA inspector fits; more than one necktie or dress sleeve had to be consumed by this arrangement. Please be careful when you fire up yours!

A ticker transmitter (above), cover in place. The large geared wheel revolves the cylinder; friction pads are mounted on both sides of the gear. Below, the transmitter with cover removed, showing the segmented wheels and peg stops on the cylinder.



A diagram of the step-by-step ticker operation. "TM" is the type magnet; "PM" the press magnet. From American Telegraphy: Systems, Apparatus, Operation by William Maver, Jr., 1892.



MEET THE COLLECTORS

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THEATER SOUND IN YOUR HOME

Western Electric products have always fascinated me, from the old telephones of my childhood to today's modern terrestrial microwave. I was first introduced in detail to WE sound during my hitch as a part-time theatre projectionist (1950 thru 1963). During the early part of this period, I also worked in theatres where I was exposed to RCA photophone, Motiograph etc. And I worked with a variety of projectors including front shutter Powers, Simplex (all the models except the XL) and some Motiograph.

The frequency response of my hearing is now worse than 144 noise weighting in the WE 2A noise measuring set, but I can still appreciate good audio as there is such a thing as "presence" and WE Mirrophonic had it.

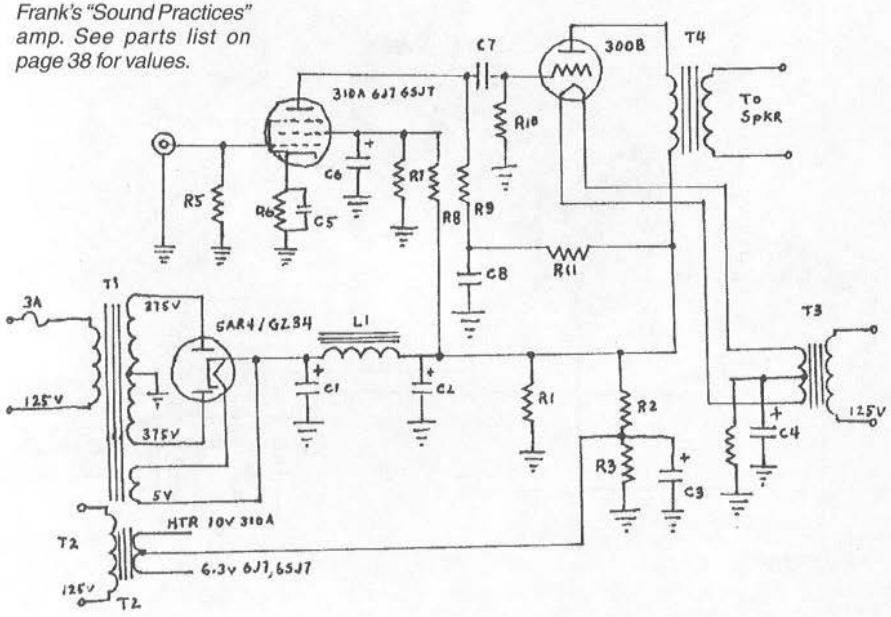
A lot of our present day sound technology had its origins in the 1930s, when high performance sound was introduced into America's theatres. The Western Electric Company variable density sound (Mirrophonic) was the leader in this field, but it was soon rivaled by RCA's variable area (Photophone) sound.

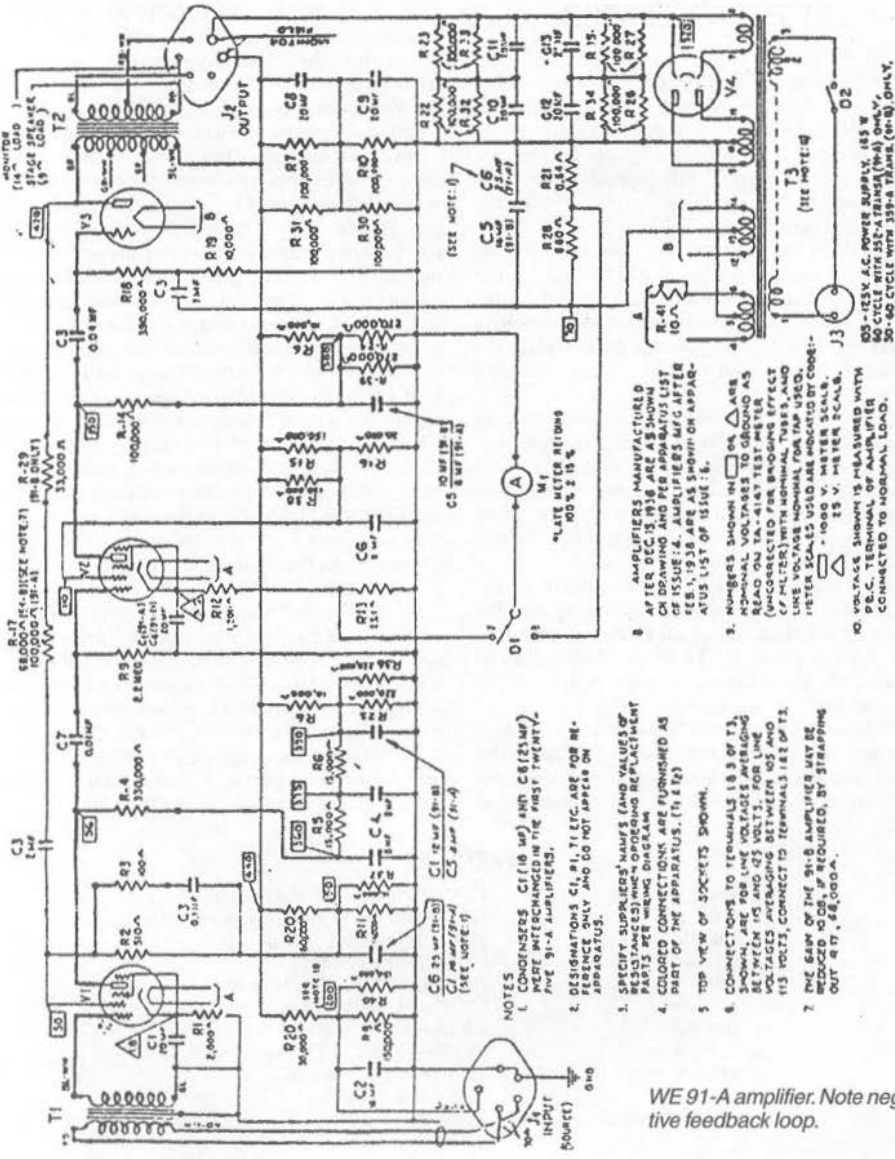
Both companies had developed equipment for on-set recording and theatre reproduction of sound. These systems were installed and maintained by ERPI, a division of WECO, and RCA Service Co.

Western Electric sound, even today, is sought after and admired by collectors. The performance specs are impressive: -5db at 40 cycles — flat from 100 Hz to 10 kHz and the sound effects are astonishing. But the equipment is very scarce and expensive. It takes perseverence and luck to find it.

Mirrophonic systems generally used the WECO 86 or 91 amplifier. The 86 has a maximum of three 262A tubes driving a pair of p-p 300 A or B's using

Frank's "Sound Practices" amp. See parts list on page 38 for values.





WE 91-A amplifier. Note negative feedback loop.

the 274A (similar to the 5Z3) as a rectifier. The V2 stage could be bypassed and the gain adjusted. The 91 was a smaller unit, using a single-ended 300 A or B amplifier driven by two 310A pentodes.

I don't know if the 91 was driven by one stage of audio before passing to the changeover switch, but I know each soundhead fed a single 262A amplifier before going to the changeover switch.

The system preceding the "Mirrophonic" was fed either by a phono pickup, which played large 33 1/3 records synced with the film, or sound on film. The records were synchronized by placing the pickup on the record's "start" mark and setting the film on a special "start" frame. If the film broke, two feet around the break point were removed — to be replaced by two feet of black film to maintain synchronization.

The 12 V.D.C. supply for the tube filaments, exciter lamps and field coils was supplied either by storage batteries with charger or a motor-generator.

Continued on page 38

— MEET THE COLLECTORS

Continued from page 37

A 49A preamp (2-264 B tubes) drove a main amp (46A) of 2-264B tubes driving a pair of 205 Ds with two 205D's as a full wave rectifier. A larger version used a pair of 211's with two 211s as the rectifier. The amp drove a pair of 555A speakers with horns placed behind the typical pink tint plaster screen designed for silent films.

I don't know what this system was really capable of; it usually sounded crisp & "boxy" — probably due to the acoustics of the long and narrow theatre. One of the options of the system was an electronic regulator for the projector motors where the meter reading defected any malfunction of the film drive.

The sound heads were type 206 and very conventional. The Mirrophonic system, which revolutionized the whole state of the art, used the type 211 where the film went around a damped drum, then back into the projector. In the drum was a prism which projected the variable light track from the film to a photocell in the sound head door.

As the Mirrophonic systems revered by the audiophiles became scarce, many single-ended home-brew and kit-built circuits were built using the 300 A/B. A single WE31OA, WE348A (king of scarce), 6J7 or 6SJ7 drove the 300 A/B with a 5AR4 rectifier in the power supply.

One such design, the "Sound Practices" amplifier, was built by Frank Hagenbuch of Williamsport, PA. Frank had minimal construction experience, but with the help of Lud Sibley and a few friends, he put a very nice amplifier using a 6SJ7 (some experts recommend glass) driving a 300 B output tube.

Using info provided by Angela Electronics, he followed the physical layout of the Angela 91 amplifier. Parts came from Antique Electronic Supply, Lud, Angela Instruments, and a new supplier that I never heard of: "Homemade Electronics," Allentown, PA. They specialize in parts for home brew tube circuits.

Frank had heard that electrolytic condensers didn't sound good, so he decided to use oil-filled or polypropylene caps where higher capacities were required at critical circuit points. He also substituted 1-watt carbon resistors for the 2-watt units specified without degrading performance. Frank wired his parts on an aluminum chassis which he treated with lye.

He is happy with the Chinese 300B but also tried CETRON 300 Bs — no change in sound but slightly less volume. There is a school of thought that 5.8V on the filaments of the Chinese 30OBs makes for better sound, though tube life is greatly shortened. In this case, 5 volts were used. Plate voltage on the 300B was high (470) so he used a 180 ohm hi wattage resistor in the B+ lead to drop it to the required 425. A .5 meg pot was substituted for the fixed resistor at R5.

The finished amplifier has a very pleasing sound, a lot of gain, and nice "sparkling" highs. Frank says to use lo drive, sensitive speakers with the amp: his Genesis & Altec do well as does his Klipsch. The Mirrophonic system used a speaker similar to Altec with a tweeter and crossover network.

We could go on and on discussing hook-ups, parts layouts, etc., but the best thing to do is investigate, look, experiment & LISTEN!

PARTS LIST

R1 50K 25W w.w.	Cl-C2 15 mfd 500V electrolytic
R2 270K 2W	C3 5O mfd 10OV electrolytic
R3 20K 2W	C4-C5 16 mfd oil or film cap
R4 880 ohm 5OW w.w.	@ 75 VDC or greater
R5 220K 2W	C6 8 mfd 200V oil or film cap
R6 1.2K 2W	C7 .1 mfd 60OV Vitamin Q
R7 30K 5W	C8 15 mfd 500V oil or film cap.
R8 75K 5W w.w.	Tl 375-0-375 V. @ l25 ma., 5v. @2A.
R9 91K 2W	T2 1OV @ 500 ma C.T.
R10 390K 2W	T3 5V @ 1.2A. C.T.
R11 27K 10W w.w.	T4 Angela Instruments "Audio Note"
	L1 10 Hy 125 ma

All resistors are Allen Bradley composition 5% or equivalent.

REFERENCES AND SOURCES

Motion Picture Sound Circuits— Finn
Riders Vol. 1
Sound Practices, PO Box 180502, Austin, TX 78718
Angela Instruments, 10830 Guilford Rd., Annapolis Junction, MD 20701
Home Made Electronics, 124 South 12th St., Allentown, PA 18102
Electrical Engineers Handbook, Pender-Mcilwain
Western Electric & RCA handbooks & sales literature

Further questions should be addressed to Frank Hagenbuch, 1440 LaFayette Pkwy., Williamsport, PA 17701.

AWA Review Now Available

Beginning with Vol. 1 of *The AWA Review* in 1986, the Antique Wireless Association has sought and published the efforts of dedicated workers who have researched and documented the records of past events associated with the history of wireless communications. Eleven years later, Vol. 10 continues this established tradition by presenting six papers by experts on their respective subjects.

• The lead paper, by noted AK authority Ralph Williams, presents the person Atwater Kent as a master of the art of marketing.

• Mike Adams, the Charles Herrold Expert, has taken his research into the realm of the development of the radio-telephone with an extensive and landmark article on the five key individuals and the technology which made it happen.

• Chris Bacon has recounted the history of RCA's Radio Central, the huge radio transmission facility at Rocky Point on Long Island, which was so prominent in world affairs for over six decades.

• Al Jones and Hank Olsen, historians and tube experts, have written the story of Heinz and Kaufman and its landmark legal battle with Sarnoff and the Radio Trust.

• Parker Heinemann describes the formation and the early years of the Collins Radio Co., and includes some superb photos of early Collins transmitters.

• Finally, long-time contributor Floyd Paul describes the early years of the Gilfillan Radio Co. and includes photos of some desirable collectibles.

Vol. 10 of *The AWA Review* may be ordered from Dexter Deeley, 8 Briar Circle, Rochester, NY 14618. Its 261 pages contain some 190 illustrations. Price $20 postpaid (continental U.S.). Write for foreign pricing.

PAPERS NEEDED FOR REVIEW VOL. 11 TO BE PUBLISHED IN 1997

Authors who wish to contribute to The AWA Review, Vol. 11, to be published in 1997, should contact the editor and describe in general terms the content of the paper and its length. A detailed contributors' guide will be forwarded. Timeliness of contributions is important, as several months are required for the editing and production process.

Contact: William B. Fizette, K3ZJW, AWA Review Editor, RR1, Box 55, Henryville, PA 18332, (717) 629-0637.

A 160-METER SINGLE TUBE POWER MOPA TRANSMITTER

By Frank J. Lotito, K3DZ
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In the May 1996 OTB, *Author Frank Lotito gave us the provocative article* Vintage Circuits With Modern Parts. *In this follow-up, he applies the philosophy of that article to the construction of a "1929-ish classic Hartley oscillator transmitter." Frank obviously enjoyed the exercise. If you are a ham who'd like to try a golden-age transmitter circuit without consuming expensive authentic parts, you might enjoy it too! — MFE*

Want to try a low budget, easy to build version of a 160 meter, MOPA CW transmitter? My version of this one-tube rig is based on a circuit developed by W3GJ and published in the *1934 Short Wave Manual* edited by H. Gernsback [1]. Using breadboard construction, non-critical junk-box parts and a little file-to-fit ingenuity, this low power transmitter will give you hours of good old fashioned QSO fun.

The original circuit used a UX860 screen-grid power tetrode with a Colpitts oscillator in the frequency determining portion of the circuit. It was constructed in an all metal enclosure, and bandswitched via plug-in coils. With a little more than 1,000 volts on the plate, power output was about 70 to 100 watts, depending upon the band.

My version of the set uses a metal 6L6 with a Hartley oscillator generating the r.f. About 8 watts output is realized for 12 watts plate input. It's designed for single-band operation (160 meters) and built on a breadboard.

The transmitter's construction is straightforward and has the air of "antiqueness" with a tad of chirp to add to the authenticity. Antenna and feed line sway during windy nights does not change the note's pitch.

My original goal was to build a 160 meter Hartley oscillator transmitter using a triode-connected 6L6. Sort of an inexpensive junk-box-hewn poor-antique-buffs 1929-era classic. Everything went fine; tone and stability were excellent on a Heathkit 50-ohm Cantenna. Tests on my open-wire feed, short, non resonant inverted-V indicated that the transmit frequency was about 120 kHz higher than on the Cantenna. Repeated antenna tuner checks with a noise bridge [2] indicated that the tuner's input at 1810 kHz was close enough to 50 ohms resistive with no reactive component. It finally dawned upon me that the Barkhausen Criteria For Oscillation [3] was better met 120 kHz higher when the tuner-feeder-antenna circuit was connected in place of the Cantenna.

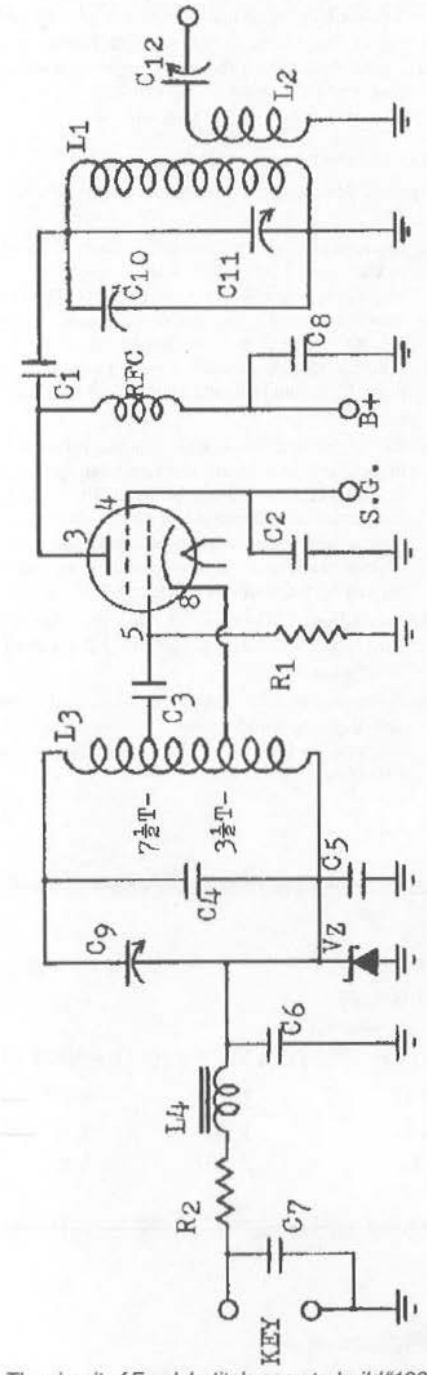
What to do now? Father Christmas to the rescue, thanks to an XYL who suggested that Santa drop off a few big boy's toys and books! The reprint of Gernsback's *1934 Manual* I found under the tree saved the day! With a little modification and an extra breadboard to mount the ECO's Hartley oscillator coil and tuning capacitor, an almost identical transmit frequency was realized whether I was on the dummy antenna or my inverted-V antenna system!

The circuit (see schematic), is a Hartley ECO, using the tube's RF grounded screen as the oscillator's plate, with fundamental electron coupling to a parallel-tuned plate circuit (both the grid-cathode and plate circuits are tuned to the same operating frequency). Output is taken from a 4-turn link with series capacitor to match my tuner's 50-ohm design center input impedance.

Since the tube's cathode is not at RF ground, a center tapped filament circuit was used, with the tap connected to the RF-cold or "key" side of cathode bias resistor R2 [4]. This configuration eliminated the need for a low DC resistance filament choke system as found in modern cathode-driven grounded-grid amplifiers. By the way, Zener diode V_Z keeps the cathode voltage from going too high during key-up conditions.

I consider this a "semi-ECO" circuit because good ECO practice uses a true suppressor grid pentode with both the screen and suppressor grids at RF ground. The beam power 6L6 is not a true pentode; a fair amount of electrostatic coupling exists between the beam forming plates and the tube's "electron current sheets." Since the beam forming plates are internally connected to the cathode, a small amount of the plate circuit's energy and plate circuit loading disturbances are coupled back to the 6L6's non-RF grounded cathode.

I believe this is the primary cause of the MOPA's small amount of chirp. Caution is suggested if you want to scale this approach to the 80 or 40 meter bands! Isolation from antenna and feed line sway never seemed to be a problem. Note the tapped down grid and cathode connections on the Hartley coil, an easy way to promote higher selectivity in the tuning circuit. (This technique was known in the early to mid-1930's.) The "kluge" click filter (L4, C6) is a junk box special, introduced with the goal of minimizing key clicks without introducing more chirp due to slowed oscillator turn-on and turn-off.



The circuit of Frank Lotito's easy-to-build "1929-ish" classic Hartley Oscillator. (Drawn by Tony Jacobi.)

PARTS LIST

R1	100K 1/2W carbon
R2	470 1 W carbon
C1	.01 pF 1500KV ceramic
C2	.02 pF, 600V ceramic
C3	140 pF 250V silver mica
C4	280 pF 250V silver mica
C5	.02 pF 600V ceramic
C6	2 pF 100V paper
C7	2 pF 100V paper
C8	.02 pF 600V ceramic
C9	500 pF+100 pF* variables
C10	250 pF variable
C11	250 pF variable or xmitting mica
C12	2500 pF** variable and fixed
V1	6L6, metal, pin #1 grounded
V_Z	45V 1W Zener diode
SG	250 volts, regulated
B+	425 volts filtered

* used for fine frequency control

** any combination of fixed and variable allowing for link tuning

DC screen voltage is derived from "a battery eliminator," an OC3 in series with an OD3, thus promoting oscillator stability. Plate voltage is about 425 volts key down. The power supply uses a full wave 5Y3 rectifier feeding a single stage pi-filter. A more "period" type 80 tube could have been used, but we all know the 5Y3 is basically the mid-1930 octal version of the type 80. I guess we could also say that the 6L6 is a sort of a juiced-up mid-1930 version of the type 47. Other reasonably inexpensive and easy to find tubes could also have been used instead of the 6L6, including the type 41, 42, 6K6,or 6F6. The 6Y6 could also be used at significantly lower plate and screen voltages. Post-1950 TV sweep tubes could also be pressed into service.

If you are adventurous and possibly have a spectrum analyzer with all the necessary accessories to verify harmonic content, you could try higher plate voltages and key down currents. With tubes like the 807 or 6146 you could easily get 40 or more watts output. One or more half-wave low-pass 160-meter output filters should be inserted in the coaxial output line if you opt for higher power output configurations, and an all metal enclosure will likely be in order.

Initial tune-up is easy. Before applying power and the load, use a grid-dip meter to adjust the grid-cathode and plate circuits to the low end of the 160 meter band. Insert a 0-100 ma d.c. meter in series with your key to measure cathode current. Without a load connected, power up, then key down quickly, tuning the plate circuit for minimum cathode current. Next, using a communications receiver with CW or SSB capability, verify the frequency and check to

Continued on page 42

— 160 METER TRANSMITTER

Continued from page 41

make sure the oscillator is operating at only one frequency. Search from about 500 kHz up to just below the second harmonic [5]. If you find a multitude of birdies, don't panic. Move the grid tap and/or the cathode tap up or down a half-turn or so. Tune for minimum cathode current. Also check for HF and VHF parasitics. Retune the plate for minimum cathode current, and again check with a frequency search [6].

Once the transmitter is properly operating on one frequency, connect to a dummy 50-ohm load. Tune for maximum power output and minimum cathode current. Repeat the frequency search. Also look for a "double-humped" output power vs. plate circuit output capacitor setting relationship when tuning. If a double hump is found, you are over coupled. An over coupled link may produce instability or increase chirp. Retune the link, increase the link diameter, or change the number of link turns.

When all's well, proceed with the final "acid tests" Because true ECO operation is not realized with beam power tubes, your dummy load and 50-ohm antenna frequencies may be a little different, especially if you use a short open wire feed non resonant antenna (like I do), a short loaded vertical antenna, or trap loaded dipole antenna. In the daytime, when "00's" are least apt to find you and 160 meter propagation is limited, try another general coverage receiver frequency sweep check while connected to your antenna system. A nearby cooperating buddy can help.

Good luck, have fun, and do not be surprised to find out that, on reasonably low QRN nights, you have a 500 to 1000 (or more) mile operating radius for solid good old time CW rag chewing!

REFERENCES AND NOTES

(1) Reprinted by Lindsay Publications, 1987

(2) *ARRL Handbook,* 1989 Edition, chapter 25, page 33

(3) *Applied Electronics,* Truman S. Gray, Technology Press of MIT, J. Wiley and Sons, 7th printing, 1954, pages 662-664 and 680-681. Also, remember, a simple transmitter's frequency determining circuit is the combined total of the LC tuning circuit deliberately used, plus the antenna tuner, feeder, and antenna's equivalent resistance/reactance.

(4) Be careful, indirect heated cathodes do not like high heater-to-cathode voltages that appear at key-up when the cathode is keyed. To minimize the possibility of heater-to-cathode shorts, it is wise to center tap the filament supply and let the filament assume a DC key-up voltage similar to the key-up DC cathode voltage.

(5) Oscillators may operate on more than one frequency if over-coupled, parasitic LC constants are present.

(6) Know your receiver's image, overload and spurious response before doing a frequency search. You don't want to confuse receiver limitations with transmitter problems.

COIL TABLE

(all air-core inductors)

ITEM	#TURNS	WIRE SIZE	DIAMETER	LENGTH
L1	22	#10 AWG	3.72"	6.7"
L2	4.6	#12 AWG	4.90"	1.4"
L3	19	#12AWG	2.50"	3.2"

EQUIPMENT RESTORATION

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478 Sycamore Drive, Circleville, OH 43113
All correspondence requires SASE for reply.

From the Editor: Keith Gobeski's query (OTB, Vol 37, No. 3) about whether the function of the Atwater Kent "Tube Shades" he found was to block light from the tubes drew responses from Phil Weingarten (Forest Hills, NY) and Lane Upton (Pine Grove, CA). They say they had nothing to do with shading the tubes, but were intended to relieve another problem with early tubes. Because the elements were not well-supported, tubes often acted like microphones. Any vibration of the tube changed the element spacing and modulated the electron stream at an audio rate. Tubes could be so sensitive that the set would howl from speaker vibrations feeding back to the tubes.

Putting a heavy cap ("howl arrestor") on the tube increased its inertia and reduced the microphone effect. I agreed with Phil and Lane until I talked with Ralph Williams (the AK authority) at the September AWA Conference. Guess what, guys? We are wrong, and Keith is right!

Ralph says the Shades were stamped of thin metal and weren't nearly heavy enough to dampen tube vibrations. Several bright-emitter tubes in an "open" set could give an objectionable amount of light. According to Ralph, "Tube Shades" were intended to do just that - block the light.

The next contribution by Ross Smith (Elkhart, IN) is reprinted from the newsletter of the Northern Indiana Members of the Indiana Historical Radio Society.

RESTORING A LEUTZ C SERIES SUPERHETERODYNE RECEIVER

DESCRIPTION

In the early 1920s there was much activity in the design of superheterodyne circuits even before RCA released the first superhets (AR-812 and Radiola VIII). Since RCA refused to license the Armstrong patents to anyone until forced to in the antitrust settlement of 1930, others were limited to designing and selling kits of parts for amateurs and home builders to assemble.

Blueprints and parts for the Leutz designs were sold from 1923 to 1925 by Experimenters Information Service (EIS). EIS was formed in 1921 by Charles R. Leutz and Claude Golden after Leutz left the Marconi Co. All of the C series sets were housed in mahogany cabinets 40" long, 8" high and 8" deep. There are at least five versions of the series as follows:

1. Model C uses eight tubes. Depending on sockets and filament rheostats, the tubes can be Type UV199 or Type UV201. It is designed for a loop antenna, but an external adapter unit was available for outside antennas. The Model J 2-stage r.f. amplifier was also available. The Model C has 4 rheostats and one "stabilizer" potentiometer. The audio stages are biased with a 4½ v. C battery located inside the cabinet.

2. Model C-7 STANDARD uses 7 tubes and no loop. Inputs are provided for long and short antennas. It has one less i.f. stage than the Model C. It has only two rheostats, one marked "Master" and one for the second i.f. stage marked "Volume." There is no "Stabilizer" control. It uses two C batteries — 9 v. for the first detector and 4½ v. for the audio — also located inside the cabinet.

3. Model C-7 IMPROVED had copper shielding on the interior of the cabinet. It could be purchased without the customary voltmeter and ammeter at a reduced price. Three sets of plug-in coils were available covering 20-600 meters.

4. Deluxe Model C-7 had all the connecting terminals on the rear instead of the front panel and came without meters. It had only one "Master" rheostat and only one audio output jack. The others had three jacks — one for each audio stage.

5. Model C-10 is similar to the C-7, but has three tuned r.f. stages ahead of the first detector for a total of 10 tubes and five tuning capacitors. The r.f. tuning is ganged so that there are only three tuning dials. This model was designed for the Navy with plug-in coils covering 50-600 meters.

All models except C-10 used two tuning capacitors made by General Radio. The oscillator ca-

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— RESTORATION COLUMN

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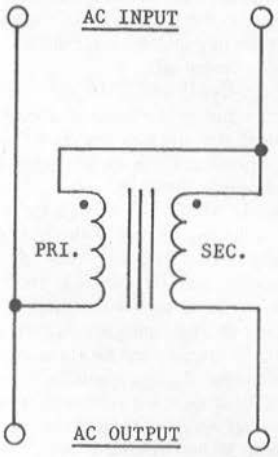
pacitor was marked "Heterodyne" and the antenna tuner was marked "Wave Length." The i.f. transformers (called "Radio Frequency" transformers) were either EIS Model C or RCA Model 1716. Tube sockets were made by General Radio, audio transformers were General Radio Type 231A or GE Model UV712 and the meters were Jewell or Weston. Western Electric made the bypass capacitors and filament switch.

RESTORATION

I had a Leutz superhet purchased from Serge Krauss. Since they were sold as kits, the quality of construction reflected the skill of the builder. Mine was built by a novice; the wiring was terrible, a mass of #12 wire, parts and different colored spaghetti. The only course was to tear it down completely and start over.

Examination of the set showed that the hard rubber panel was a Model C, but the seven-tube circuit was a Model C-7. This hybrid enabled me to see the differences between the models. The rebuilding afforded a chance to clean and test all components as well as to refinish the cabinet and baseboard.

One General Radio audio transformer and both 47 kHz i.f. transformers were open. The audio was rewound, but the i.f.'s were another matter. How do you get into a 3¾" diameter barrel-shaped EIS transformer with a sealed end plate?



Small transformer with 6-10 volt, 3-amp secondary is wired in bucking configuration to reduce line voltage entering vintage sets.

I carefully drilled a one-eighth inch hole near the top of the plate, inserted a hook made from coat hanger wire and pulled. Nothing happened. The next step was to heat the transformers in the oven (when my wife was away) at 225° F. for 45 min. The plates then came off with a good pull. As suspected, the coils were potted in wax.

One coil had a break at the termination point and was easily fixed, but the other was open somewhere inside the coil. I found a Remler 600 i.f. coil which easily fitted inside the EIS case and used it as a replacement. It appeared to be a good electrical match for the original.

The original C batteries were still in the set. There were two Eveready #751 4½ v. batteries to furnish 9 v. bias to the first detector and one #703 4½ v. unit for the audio. I reinforced the paper cases with two coats of clear acrylic varnish then carefully cut them open and replaced the contents with AA cells in series.

The set operated well when powered up. Although there is no provision for a loop antenna in the C-7 circuit, my hybrid had two General Radio screw terminals marked "LOOP" at the lower left side of the panel. I wanted to use a newly restored RCA AG-1380 loop with the set. Since the antenna coil was a plug-in affair, it was easy to remove it and insert the loop. Performance with the loop was the same as when using a 40 ft. long wire antenna, For noise-free operation, I found it necessary to connect the center tap of the loop to ground with a third wire from the loop. This project was an interesting and educational challenge.

REFERENCES

1. *Old Timer's Bulletin*, Vol. 4, No. 1, p. 11.
2. C.R. Leutz, *Modern Radio Reception* (1924).

Ed: This set won a blue ribbon in the Old Equipment Contest at the recent AWA Conference. This large and impressive radio was beautifully restored.

The next contribution from Lane Upton (Pine Grove, CA) is a follow-up on my comments about protecting old sets in the previous issue of the OTB.

COMMENTS ON REDUCING INPUT VOLTAGES FOR OLD RADIOS

Recently I have seen many suggestions for reducing the AC input voltage to old radios. The concern seems to be that today's nominal power line voltages (118 to 120 volts) may do damage to tubes, transformers and other components, however, it is possible to harm the tubes by reducing the AC input voltage too much.

On the other hand, I fully agree with the Editor (Ref. 1) that inrush current limiting is a great idea.

Typically, tube filaments open up on the initial inrush current.

The following facts may help the collector make a better decision on how much to reduce the AC input voltage:

1) The 1940 NEMA "Preferred Voltage Ratings" (Ref.2) were:

Nominal Circuit Voltage — 115 v.

Highest Rated Voltage Of Apparatus — 120 v.

2) Today's nominal voltage ranges from 118 to 120 v.

Highest Rated Voltage Of Apparatus — 125 v.

3) The sum of the heater voltages for tubes in the AC/DC sets (either octal or miniature) are:

For the 5 tube sets — 122.8 v.

For the 6 tube sets — 120.4 v.

Logo appearing on the bottom of the mystery tube's base. Anyone recognize it?

4) Filament/heater design criteria (Ref. 3) requires operating the tube "at rated normal value, and variations from this normal value should not exceed ±5 percent". But it also states: "it is a matter of experience, however, that the heaters and filaments of most modern oxide-coated types may be operated at voltages whose maximum fluctuations do not exceed ±10 percent from their rated value, without serious effect on life of the vacuum tube."

5) Long term operation of an oxide-coated emitter at excessively reduced voltage will eventually exhaust the space charge and the tube will suffer from low, or zero, emission. This is known as "sleeping sickness." Usually it can be corrected by operating the tube at rated filament or heater voltage (no plate voltage) for several hours.

Considering these facts, I recommend that the AC input voltage be reduced by no more than 10 v. This represents a reduction of slightly less than 10 percent, and still will provide adequate protection with line voltages as high as 125 v.

A 10 v. maximum reduction will also help assure that the "weak" tubes will continue to operate in the set to the end of their useful life. Toward the end of its life, the temperature of an oxide-coated emitter becomes extremely critical.

Rather than modify the radio, I suggest using a small transformer, with a 6 to 10 v. secondary, connected in a bucking configuration. See schematic. An inexpensive transformer with a 3 to 5A secondary could provide power to an outlet strip with adequate capacity for several radios. CAUTION: do not use a fuse in the primary of the transformer because the open circuit primary voltage can exceed 1,000 v.

Limiting the inrush current is an excellent idea, and it would be ideal if every radio had this incorporated. The vacuum tube filament/heater is just like a light bulb — it generally burns out when first turned on due to the inrush current.

For units with power transformers, the initial surge of filament or heater current is especially hard on the transformer. A cold filament will draw from 5 to 7 times the rated current during the first few power line cycles. Also, surge limiting helps hold down the initial high excursion of the B+ voltages.

A practical solution to this problem might combine reducing the line voltage by 6.3 or 7.5 volts together with individual current limiting in each set as proposed by the Editor.

REFERENCES

1. *Old Timer's Bulletin,* Vol. 37, No. 2, May, 1996.
2. *Standard Handbook For Electrical Engineers,* 7th Edition, 1941
3. *Radiotron Designer's Handbook,* 4th Edition, 1953

The following solution to a tough restoration problem comes from Scott Todd (Cambridge, MN).

WHY THE OSCILLATOR DIED

Many times I had attempted to repair a GE-made Kaiser-Frazier auto radio without success. I would put it back on the shelf for months until I got another idea. The problem was that the oscillator wasn't working as evidenced by the positive voltage on G1 of the 7B8 converter. If a signal was injected into the oscillator, the set worked. Once in a blue moon it would work on its own.

Having heard that mica capacitors occasionally open up, I bridged all the caps in the oscillator circuit with good ones without success. All resistors were OK. I removed the oscillator coil (big job), and it checked OK. Knowing how much trouble tubes sockets can cause, I bit the bullet and replaced the 7B8 socket. The set still didn't work.

I finally stumbled on the solution when I biased the oscillator with a 9 v. battery. The set still didn't play, but I decided to recheck the converter voltages. The signal grid was slightly positive which shouldn't be. I had noted a positive voltage earlier, but with the set not playing, there would be no AVC

Continued on page 64

THE AWA ANNUAL CONFERENCE REPORT

With Contributions From
Lauren Peckham, Bruce Roloson, Lud Sibley and Ralph Williams

This year's conference, celebrating 100 Years of Atwater Kent, went off without a hitch as usual. Some 850 registrees from the U.S., Canada, Brazil, New Zealand, Japan, Sweden, Australia, France, Italy and England (to name most of the countries represented) happily immersed themselves in radio history and hardware for three and a half solid days

Bruce Roloson was the overall conference organizer. Advance registration was handled by Dick Ransley, with Joyce Peckham in command of the on-site registration army. Lauren Peckham organized the conference sessions and Ralph Williams managed the equipment contest.

Ed Gable assisted with the flea market setup; Mike and Bob Raide put in days of hard work making the event run smoothly. Special thanks to Bruce Kelley for staffing the museum so members had plenty of opportunity to visit it at the conference. Kudos also to the dozens of others who worked so hard to make our 1996 annual conference a success!

FLEA MARKET

The flea market displayed its usual tendency to peak at 9 a.m. on the first day. Trade was brisk in Western Electric and other audio tubes, including a couple of real bargains in early and rare types, not to mention the usual junk-and-treasures. Items seen also included many AK breadboards, Federals, Grebes, a Paragon RA-10 and many more choice offerings. Weather was excellent throughout the conference, if a little torrid now and then.

THE SESSIONS

Bart Lee's Wednesday "News For SWLs" session regrettably had to be canceled because a leg injury kept him from attending the conference this year. We missed you, Bart, and wish you a speedy recovery! Substituting for Bart was a fascinating AWA-produced video presentation on the history of radio station WHAM in Rochester and featuring Bruce Kelley as narrator. Later that day, Murray Willer moderated the yearly Key and Telegraph seminar with presentations by Tom French, W1IMQ ("Keyers and Paddles and How to Collect Them"), Pete Malvasi, WB2BYQ ("Old Telegraph and Wireless Keys"), and Tom Perera, K2DCY ("Key Collecting in Europe With Emphasis on German Bugs").

Thursday's sessions began with Ralph Williams' fantastic "Atwater Kent Master Marketer." Not only did we enjoy Ralph's comprehensive and lively presentation, but several members contributed to a remarkable display of AK artifacts, bringing together a collection of seldom-seen items that included unusual sets, sales aids, literature and a number of early non-radio products: ignition systems, motors and even a theodolite and sighting level manufactured for the U.S. Army.

Later that day Jerry Vanicek, using material from a book he is developing, gave a slide talk on rare vacuum tubes with special emphasis on Fleming and Weagant valves. He accompanied the tube photos with shots of original correspondence giving insight into the development of early tube technology. Jerry promises a similar talk on vacuum tube history, drawn from another chapter of the book-in-progress, at a future conference. In Thursday's final presentation, Chris Bacon introduced Marshall Etter, former chief engineer of RCA's legendary "Radio Central" at Rocky Point, Long Island. Marshall offered an authoritative slide talk on Radio Central and its companion receiving site at Riverhead, 16 miles away.

The Friday amateur-radio session was enhanced by display of the old-time breadboard transmitter built by OT Contest winner Ralph Thomas, W2UK. The transmitter (push-pull 210s) was donated to the AWA Museum after Thomas' death. Previous contest winner Marshall Etter, W2ER, was photographed proudly displaying this rig.

Saturday brought a description of the Museum of History and Technology presented by Lloyd McIntyre. This interesting building, located in West Virginia, includes good displays of early radio and radio stations. And closing out the meet was Bruce Kelley's "Pre-1912 Wireless and Electrical Apparatus Display," where members exhibit early wireless apparatus in an informal and friendly contest judged by Ray Hutt of the Smithsonian Institution. Ray McClellan won first prize with a very early electric motor; Peter DeAngelo won second with a fine early meter having an unusual movement.

AUCTIONS

Ed Gable's communications-equipment sale on Thursday included a group of coilsets for the World War II German version of the National HRO receiver. Friday's all-day auction was expanded by the inclusion of material from three estates and Museum-support donations. It took all day for the over 500 lots to

cross the block, in which process about $60,000 changed hands.

Among the literature offered was an unusual supply of early radio catalogs in good condition and a letter signed by Samuel F. B. Morse. High-interest tubes included a spherical audion (one filament good), a French Métal E4M transmitting tube from World War I, two iconoscopes, a scarce WE 224B 'scope tube, and lots of WE audio types. Early radar tubes may have become "collectible": there was spirited bidding for magnetrons and other specialized types in little demand a few years ago.

The general segment of the auction included a nice DeForest six-unit Interpanel (deaccessioned by the Museum), an excellent Federal 59, a sharp Grebe CR-5, and an L. M. Ericsson all-brass telegraph register.

EQUIPMENT CONTEST

The Equipment Contest, with categories structured around various facets and eras of the Atwater Kent business by master contest organizer Ralph Williams, featured an unusually sumptuous array of Atwater Kent store-display fixtures. Other "odd" AK exhibits included auto ignition systems and related paraphanalia. Non-AK rarities on display included Mike Feher's "rarely seen" Martian Beauty one-tube set and Robert Lozier's latest exhibit of Italian radios, featuring Geloso sets this year. A Complete list of category winners appears at the end of this report. See "BANQUETS" for the overall contest winners. Judges were: Floyd Bennett, Larry Chestnut, Chris Bacon, John Wiesner, Scott MacWilliam, Alan Douglas, Geoff Bourne, Elinor and Ralph Williams.

OTHER ACTIVITIES

This year's book fair opened a day earlier than usual, with vendors showing their wares as the conference opened on Wednesday. Business seemed unusually brisk, with heavy attendance throughout most of the conference. Hisashi Ohtsuka, author of the beautifully photographed and produced *The Classic Valves* (right now, unfortunately, available only in Japanese), was on hand to autograph copies. Another new book was presented at the fair by Ludwell Sibley, who showed an advance copy of his Tube Lore.

Wednesday evening found a large crowd at the AWA Museum with Bruce Kelley, who showed many of the new displays, providing his fine commentary. The museum was also open on Thursday (when a bus was provided for easy transportation) and Saturday.

This year, the sightseeing tour took participants to view the hand-crafting of clay, pottery, glass and wood furniture pieces at the MacKenzie-Childs, Ltd. Studio in Aurora, NY. A lunch buffet was served at the Aurora Inn, and the tour moved on to the arboretums and gardens at the 200 acre "Cornell Plantations" at Cornell University in nearby Ithaca.

BANQUETS

Fellowship abounded as attendees of the gala Annual Historical Banquet tried to recognize each other in their "dress-up" clothes. The event was opened with an invocation by President Bill Fizette. Atwater Kent's grandson Peter, an honored conference guest, also spoke a few words. The annual awards were presented as follows:

• President's Award
to James Chew for his restoration of the museum's Marconi 101 receiver

• Tyne Award
to Peter A. Keller for his book on cathode ray tubes

• J.P. Taylor Award
to Albert Abramson for preservation of the history of early television

• BK-OTB Award
to George Michael for his two-part article on Dr. Ernst F.W. Alexanderson (Television column OTB 37-1 and 37-2)

• Linc Cundall-OT Award
to "Tommy" Thomas, W2UK (posthumously) — Tommy's placque, with his award-winning transmitter, will be on display at the museum.

• Houck Documentation Award
to William Orr for his prolific written work on classic radio topics

• Houck Preservation Award
to Jerry Vanicek for his outstanding work in the collection and preservation of early vacuum tubes

Entertainment was provided by members of The Elmira Little Theatre, who presented a remarkable recreation of scenes from vintage Baby Snooks radio episodes under the direction of Gary Yoggy. Three of the group, doubling as "The Boogie Woogie Girls" and accompanied by Ed Clute at the piano, brought down the house with their evocative rendition of famous Andrews Sisters numbers.

The Saturday luncheon marked the end of a very successful conference. Ralph Williams presented plaques to the four "contest level" winners of the Old Equipment Contest. As usual, we had excellent participation with many rare articles on view for all to enjoy. The four winners were:

• Thompson Award for Best in Show
Scott MacWilliam (Atwater Kent Model 511)

• Matlack Award for Transmitter Construction
Hank Brown (VFO constructed from a QST article)

• Elle Award for Receiver Construction
Ray Richardson for the Phantom Blue Mirror

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— CONFERENCE REPORT

Continued from page 47

Display Award for the Best Illustration of an History
Robert MacIntyre for the Repair of an AK Model 49

OLD EQUIPMENT CONTEST THEME CATEGORY WINNERS

• **Category 1 — Before the Radios**
1st: Ross Smith (Induction Coil)

• **Category 2 — Instruments**
No Entries

• **Category 3 — Early Open Sets**
1st: James McKinnon (AK NO. 3960 - no amplifiers)
2nd: Ross Smith (Model 8, - operating)
3rd: David Cheney (crystal set made of AK parts)

• **Category 4 — Later Open Sets**
1st: Laurence DiBarry (AK Model 9
2nd: Larry Babcock (AK Model 12)

• **Category 5 — Boxes and Bathtubs**
1st: Geoffrey Bourne (AK - Pooley 2000 Oriental Motif)
2nd: Ray Richardson (AK Model 46

• **Category 6 — Radios of the Thirties**
1st: Scott MacWilliam (AK Model 511)
2nd: John Wiesner (AK Model 246)
3rd: Clay Seidel (AK MODEL 90)

• **Category 7 — Technical Documents and Sales Aids**
1st: Scott MacWilliam (group of sales aids)
2nd: Paul Corrette (AK banner - table runner)
3rd: Joe Gruber (AK salesman's cards)

• **Category 8 — Advertising and Public Relations**
1st: Tom and Karen Pamula (document display)
2nd: Joe Gruber (AK paper dolls)
3rd: Paul Bohlander (notebook of AK paper)

STANDARD CATEGORY WINNERS

• **Category 9 — Passive Receivers**
1st: Thomas Pamula (Kilbourne & Clark)
2nd: Mike Feher (Mesco with phones)
3rd: Larry Babcock (French receiver)

• **Category 10 — One- and Two-Tube Receivers**
1st: John Parsons (Kennedy 281)
2nd: Mike Feher (Martian one-tube)
3rd: Chet Wisner (Crosley 50

• **Category 11 — Three-Tube Receivers**
1st: Ernie Hite (DeForest interpanel)

• **Category 12 — Four- and Five-Tube Receivers**
1st: John DeLoria (Fada gold piano)

• **Category 13 — Six- or More-Tube Receivers**
1st: Robert Lozier (Geloso G118)
2nd: John DeLoria (Lyric C-6)
3rd: Fred Crews (Kolster 6D with factory documents)
3rd: Tim Martin (Western Coil WC-10

• **Category 14 — Novelty Receivers**
1st: John DeLoria (Dick Tracy two-transistor & display)
1st: Karen Pamula (Charlie McCarthy)
3rd: Larry Babcock (Adam and Eve)

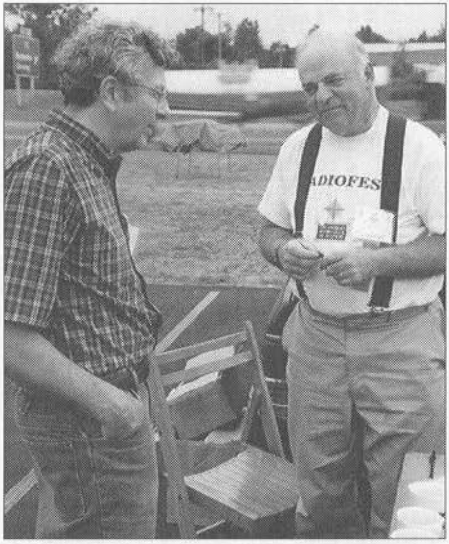
• **Category 15 — Spark Transmitters**
1st: Mike Feher (Hunt & McCree transmitter/receiver)
1st: Larry Babcock (SCR-65)
2nd: John Parsons (Homebrew Portable)
Special Award: Edward White Rotary Spark Transmitter

• **Category 16 — Tube Transmitters**
1st: Hank Brown (VFO Constructed from QST article)
2nd: Mike Feher (blue tube transmitter and receiver)
3rd: Bob Thomas (QZO 19A Exciter)
Special Award: Robert Larson (miniature board 1929 Hartley)

• **Category 17 — Restoration of Appearance**
1st: Billy Richardson (Paragon RD-5)
2nd: Robert MacIntyre (Atwater Kent with picture history)
3rd: Robert Lozier (Stewart Warner Model 1263)

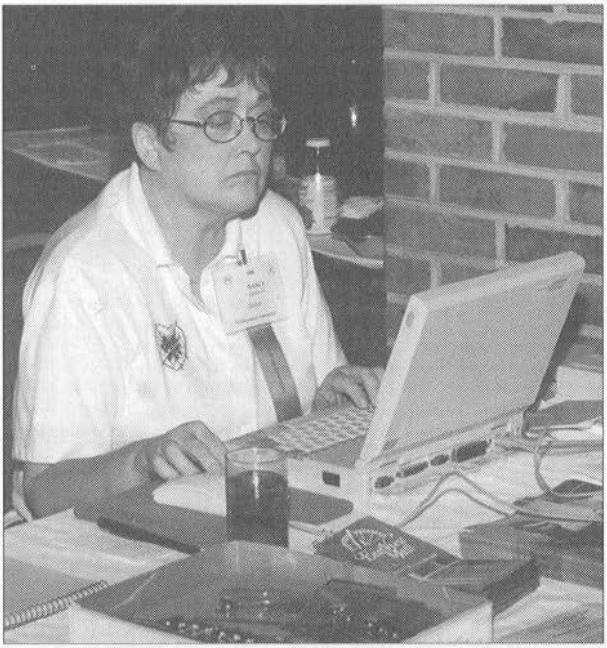
• **Category 18 — Restoration of Operation**
1st: Ross Smith (Leutz C & C7)

• **Category 19 — New or Rebuilt**
1st: Billy Richardson (Madison and Moore)
2nd: Ray Richardson (Phantom Blue Mirror)
3rd: Richard Mankiewicz (AK earphones)



Conference Program Chair Lauren Peckham (left) and your editor stop for a brief chat at the flea market.

AWA Annual Conference Photo Ops



Photos on these pages by Dick Ransley and Bruce Roloson

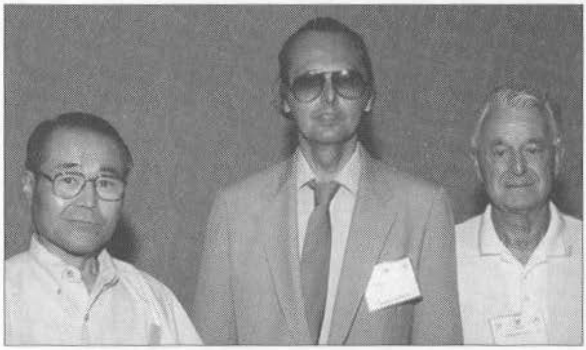
Nancy Ransley updates registrations at the main desk.

Ralph Williams and Atwater Kent grandson Peter Kent discuss fine points of a rare AK breadboard.

AWA Annual Conference Photo Ops

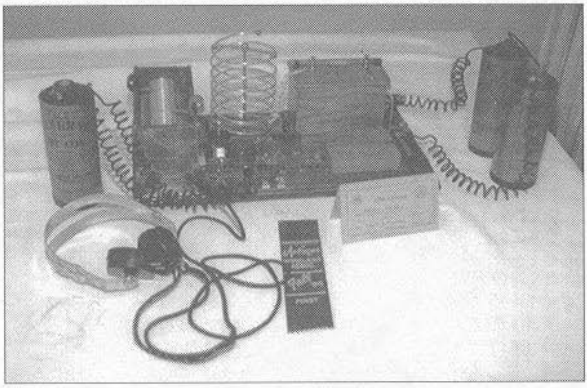
President Bill Fizette (right) greets a couple from Sao Paulo Brazil, Edison and Maria Defreitas.

Just a small selection of the wealth of Atwater Kent artifacts on display at the conference.

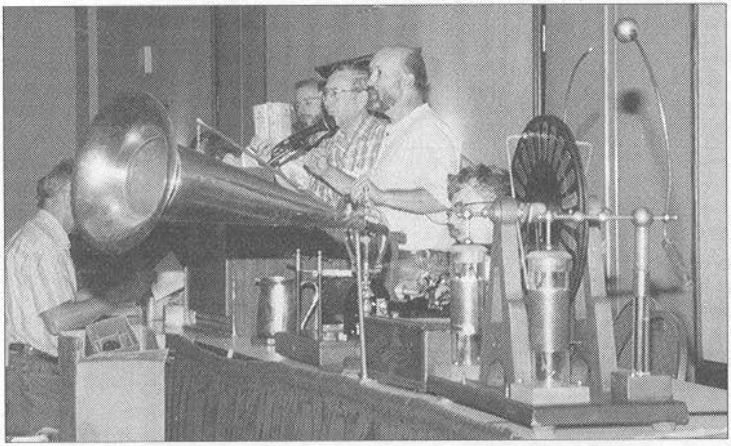


Some vacuum tube types pause for a photo. From left: Hisashi Ohtsuka, author of Classic Valves; *Jerry Vanicek, noted tube collector and recipient of this year's Houck Preservation Award; Al Jones, Proprietor of Ye Olde Transmitting tube Museum.*

AWA Annual Conference Photo Ops



Mike Feher's Hunt & McCree transmitter/receiver took first place in the spark transmitter category.

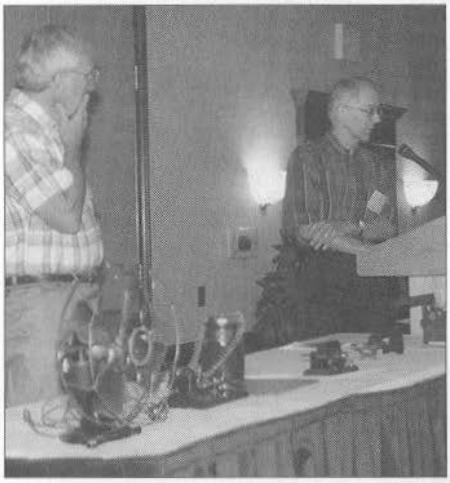


Heated bidding at the auction. $60,000 changed hands.

Peter Yancer (right) presents J.P. Taylor award to Albert Abramson for his work in the preservation of the history of early television.

AWA Annual Conference Photo Ops

Three members of the Elmira Little Theatre group, performing as the "Boogie Woogie Girls," evoke memories of The Andrews Sisters at the Banquet.



John Wenrich presents his entry in Bruce Kelley's pre-1912 electrical equipment contest as judge Ray Hutt of the Smithsonian Institution looks on.

Mike Raide announces the Old Timer's contest results at the Saturday finale luncheon as President Fizette stands by to make a presentation.

OTB BACK ISSUES

The following back issues of *The Old Timer's Bulletin* are available at $3 each postpaid, with a 20 percent discount for 6 or more issues and 30 percent off for 12 or more. The nine special-theme issues contain the normal columns and news, plus a core of features on a particular topic area. The number of special-focus pages in each issue is listed below. Index to *OTB* volumes 20-34 and the *AWA Review* volumes 1-8, free on request with purchase. Please indicate alternative choices when ordering back issues of *OTB*.

VOLUME AND NUMBER

25-4 Four-tube Superhets/Comet Pro Receiver
26-1 S-M "Around the World Four"/Cockaday BC Receiver/Building a Rotary-Gap Xmtr
26-2 National FB-7 I/L.L. Israel Bio/W'house RC
26-3 National FB-7 II/Radio in S. Africa/Mercury Super 10/Building a 1929 Receiver
26-4 Gilfillan History I/Sargent Model 11 Rcvr
27-1 Gilfillan History II/Schickerling Tubes
28-1 Dynergy AC-Powered Radio/Pilot TC-37 TV
28-2 '26 Radiomovies Today/National AGS I
28-3 Dowd Tube Collection/National AGS II
28-4 SE-1950 Radio Compass/National Sliding-Coil Receivers/Collecting Radio Batteries
29-1 Philco 17 Restoration/ZL2JJ '34 Station
29-2 Fada 460 Restoration/3ZO 1922 Station
29-3 Moorhead Tubes I/British '30s TV I
29-4 Moorhead Tubes II/British '30s TV II
30-1 GE Octagon TV Set/TR-1 Transistor Clones
30-3 **Military Equipment Special** - 17 pgs. of 48
30-4 **Broadcast Receiver Special** - 12 pgs. of 48
31-1 **1903-20 Wireless Special** - 5 pgs. of 48
31-2 **Restoration Special I** - 20 pgs. of 56
31-3 **Tube Special** - 19 pgs. of 48
31-4 **International Special I** - 11 pgs. of 48
32-1 **Communication Gear Special** - 18 pgs. of 48
32-2 An HRO Story/Loewe Tubes/GE M-81
32-4 Marconi V24 Valve/HRO in British Army
33-2 **40th Anniversary Special** ("Best of OTB, 1960-82") - all 48 pgs., incl. RCA Metal Tubes
33-4 Scott Special Rcvr/National Power Units
34-1 British Crystal Sets/National Power Units
34-3 **International Special II** - 20 pgs. of 64
34-4 Bell Labs Transistor Set/"Larkspur" Radios
35-1 Radiola & Aeriola Grand/German WW II Magnetrons & Avionics/Tech-Manual Art
35-2 Van Horne Tube Co./Philco TV Designers/ Foreign "HROs"/1200- & 1600 Series Tubes
35-3 Radiola 17 & 18/1929 Regen/G & R Valve Co.
35-4 Negatron/Mercury Super Ten/The Breting 14/ James Millen Memorial Station
36-1 Orrin Dunlap's Lab/Kolster K23/Bush & Lane Radio
36-2 Headset Update Listing
36-3 100 Years of Marconi Radio
36-4 History of Rogers Batteryless Receivers
37-1 T.V. - Dr. Ernest Alexanderson, Part 1
37-2 T.V. - Dr. Ernest Alexanderson, Part 2
37-3 Evolution of the Auto Radio, Part 1

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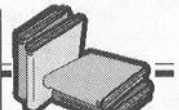
REVIEWS: WHAT'S NEW IN PRINT

EDITED BY

William E. Denk, W3IGU

81 Steeplechase Road, Devon, PA 19333-1226

Please include a SASE for reply.



Former OTB *Editor Lud Sibley introduced his most impressive new book* Tube Lore *at the Rochester Conference. At that time it was still in a photocopied temporary edition. But now the book is in print and we're pleased to be among the first publications to bring you a review. —MFE*

TUBE LORE — A REFERENCE FOR USERS AND COLLECTORS

By Ludwell A. Sibley. Published 1996 by Ludwell A. Sibley, 44 E. Main St., Flemington, NJ 08822. 186 pages. 8½ x 11 inches. Softcover. $19.95 postpaid in North America, $24.95 elsewhere. Discounts available to clubs on group orders.

Most of us develop a working knowledge of the vacuum tubes associated with our specific collecting interests. This typically exposes us to only a small part of an industry that supported American broadcast, industrial and military technologies for more than six decades. *Tube Lore - A Reference for Users and Collectors* brings together a great deal of this information starting with the 1920s and continuing thru the vacuum tube industry's demise in the '80s. Brief chapters on Trends in Tube Design, Interpreting Tube Data, and a listing of pre-RMA tubes (RMA registration didn't start until 1934) precede a listing of the tubes under the RMA/EIA system. Each listed tube includes a short description, sometimes just a few words, but more often a paragraph summarizing its characteristics and related applications or historical significance. Even with their varying content these summaries always seem pertinent and informative.

A major portion of the book (133 pages) is devoted to special purpose and military tubes plus non-RMA listed types of the DeForest, Eimac, General Electric, Raytheon, Sylvania, Western Electric and Westinghouse companies. The wealth of hard to find information will be invaluable to both the tube collector and user. Following is Tube Users Guide, my favorite chapter, containing an eclectic collection of subjects including Testers and Testing, Tube Hospital: Repair and Reactivation, Building a Repair Stock and Identification and Dating Manufacturer Codes. The final two chapters compile the TV sweep tubes used in r.f. and audio applications and summarize antique tube auction prices at the AWA and other U.S. collector gatherings over the last three to five years.

Tube Lore is a worthwhile addition to any collector's reference library and helps to bridge the gap between the technical detail of the manufacturer's tube manuals/handbooks and the historical overview of the books by Tyne and Stokes.

— By John Kelly, N3GVF, guest reviewer.

BLAST FROM THE PAST: A PICTORIAL HISTORY OF RADIO'S FIRST 75 YEARS

By B. Eric Rhoads. Published 1996 by Streamline Publishing, Inc., 224 Datura St., Suite 718, West Palm Beach, FL 33401. 463 pages. 8¾ X 11 inches. Hardcover, $39.95 + $5.50 shipping. To order, call 1-800-226-7857.

According to the Oxford American Dictionary, nostalgia is a sentimental memory of or longing for — things of the past. This really great pictorial history will jog the memory and answer the longing of radio buffs and historians for a thoroughgoing overview of radio programming from the earliest days of radio broadcasting pre-1920s through the present. The pictures range in size from full-page (8 by 11) to five per page, all of excellent quality.

There are more than 900 photographs, some never before published. The photographs zero in on performers primarily, but there are many shots of announcers, celebrities, studios, control rooms, transmitters, and antennas. There is a picture of Ronald Reagan, one-time announcer at WOC, Davenport, and at WHO, Des Moines. You'll also see Freeman Gosden, the Amos of *The Amos and Andy Show,* at his ham radio transmitter.

Containing forewords by Rush Limbaugh and Paul Harvey, the book is divided into time periods: the pre-'20s followed by each of the seven decades thereafter. This reviewer noticed only one error. The KYW/NBC building documented on page 153 was in Philadelphia, not Chicago as indicated.

On the book's back jacket, George Burns is quoted as having said, "The Golden Age of Radio. It was a time that should not be forgotten." This book ensures that it won't be.

INDEX TO RADIO AND ELECTRONICS PATENTS

By David Kraeuter. Published 1995 by UMI Research Abstracts, 300 North Zeeb Road, Ann Arbor, MI

48106-1346. 512 pages. 6½ x 8½ inches. Softcvover $57.50, Hardcover $69.50. Plus sales tax where applicable.

As the book's subtitle states, this is a "Keyword index to the titles of over 6,400 U.S. and British Patents Issued to 100 inventors, with an Emphasis on Radio and Television." This fourth and last volume of Kraeuter's series of patent indexes (see the review published on pages 18-19 of the May 1995 *OTB)* provides an index, by keywords in the titles, of all the patents cited in the earlier publications.

Thus, Edwin Armstrong's 1920 patent on the superheterodyne, entitled "Receiving High frequency Oscillations," is entered first under "H", as "High frequency oscillations, receiving, 1,342,885, 1920," then under "O" as "Oscillations, receiving high frequency, etc.," and finally under "R" as "Receiving high frequency oscillations. etc."

This index contains more than 10,000 entries and covers all patents listed in earlier indexes. A Table of Inventors lists all 100 inventors covered. For each inventor the table provides both birth and death dates, and the dates his first and last patents were issued. This book is a most valuable addition to Kraeuter's three earlier volumes.

NIKOLA TESLA: LECTURE BEFORE THE NEW YORK ACADEMY OF SCIENCES — APRIL 6, 1897

Editor: Leland I. Anderson. Published 1994 by Twenty First Century Books, P0 Box 2001, 100 South Ridge Street, #101, Breckenridge, CO 80424-2001. 6 x 9 inches. 123 pages. Hardcover $21.95, softcover $12.95.

We are indebted to AWA member, Leland Anderson, for making available in a most interesting form the text, with illustrations, of *The Streams of Lenard and Roentgen and Novel Apparatus for Their Production.* This important lecture was delivered by Tesla before The New York Academy of Sciences the year following the publication of Roentgen's work on X-rays. In addition to the lecture, Anderson has included three very interesting Tesla documents:

The first is the paper: *Wireless Telegraphy Receiving Methods; Advances in Electrical Oscillations; Experimental Vacuum Bulbs.* The second is Tesla's letter of May 1, 1897, to the editor of the *Electrical Review,* titled "The Hurtful Actions of Lenard and Roentgen Tubes." The third is a letter dated Aug. 9, 1897, also to the editor of *Electrical Review,* titled "The Source of Roentgen Rays and the Practical Construction and Safe Operation of Lenard Tubes." This last letter was prompted when Tesla became aware that precautions suggested in his previous communications were being disregarded, "and cases of injury ... are being almost daily recorded."

Some interesting biographical information about Tesla and his early life is presented in the author's preface.

LOS ANGELES RADIO MANUFACTURING — THE FIRST TWENTY YEARS (1922-1942) SUPPLEMENT No. 1

By Floyd A. Paul. Published 1993 by Floyd A Paul, 1545 Raymond Ave., Glendale CA 91201. 46 pages. 5½ x 8½ inches. Booklet. $6.75 plus $1 s&h.

This is a supplement to a book by the same author published in 1988 (88 pages); the earlier book remains available at $10.50. The supplement is basically a collection of stories about Los Angeles radio manufacturing activities in the 1920s and 1930s. It contains over 50 illustrations.

Those of us who live in the eastern half of the United States tend to think of the early radio industry as concentrated largely in the northeast, with some outposts In Illinois. But as AWA member Paul reveals in these interesting booklets, there was a substantial radio industry in southern California as well.

Included in this supplement is a three-page table of some 60 companies, their trade names, personnel, start date, and notes regarding models produced.

CRYSTAL CLEAR VOLUME II

By Maurice L. Sievers, Published by Sonoran Publishing, LLC, 116 North Roosevelt, Suite 121, Chandler, AZ 85226, 1995. 116 pages. 8½ x 11 inches. Softcover. Recommended retail $29.95.

This reviewer has not seen the earlier Volume I, but Volume II is one beautiful book, printed on fine paper that yields great B&W pictures. You'll find over 350 photos and 160 reproduced ads of crystal radio products.

As one who grew up with the nearest broadcast station some 100 miles distant (it was a 100 watter and during a visit I found that the entire transmitter was mounted on a table top), I had no experience with crystal sets, and must have ignored the ads of the twenties. Accordingly this volume was an eye-opener.

The publisher says that Volume II picks up where Volume I left off, identifying an additional 172 crystal sets, 91 crystal detectors, and 26 crystals by manufacturer, model, year produced, description, and original selling price. Referring to Sievers' earlier book, Bruce Kelley, has remarked that "Frankly, I never knew there were so many makes and models ... the book will likely become the 'bible' for crystal set collectors." I echo that thought for Volume II!

The first chapter, "Tune In: Accessories and Tuners For Early Crystal Sets," offers 12 photos of tuners of the period. There I recognized my A. Arnold, Navy type Loose Coupler, circa 1916. Its pre-WWI price was listed as $15.

A long chapter, 72 pages, is devoted entirely to pictured crystal sets with accompanying brief descriptions. Even Crosley made a few! Another section of 18 pages, crammed with photos, is devoted to the crystal detectors themselves - some fixed and

Continued on page 64

SPECIAL EVENTS STATION TO HONOR FIRST TRANSATLANTIC SHORT WAVE TRANSMISSION

By Bruce L. Kelley, W2ICE, and Donald G. Hudson, KA1TZR

Remember the thrill of your first ham radio contact? Imagine the thrill of receiving the first transatlantic amateur short wave message! Paul Godley, as the official representative of the ARRL, had that excitement in 1921 in Scotland as he received a transmission from Greenwich, CT.

Today, if you happen to be heading into Greenwich from Merritt Parkway Exit 31, you will see a monument to this special event about 1.5 miles south of the parkway. Look to your right, in the triangular intersection of North Street and Clapboard Hill Road. It is approximately 200 feet from the site of the original station. The inscription on the marker reads:

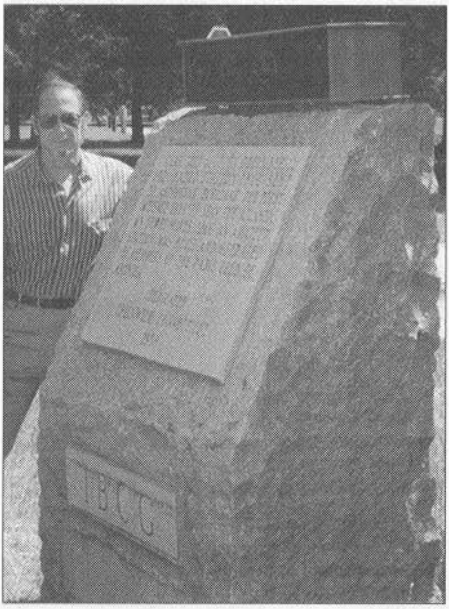
"NEAR THIS POINT ON DECEMBER 11, 1921, RADIO STATION 1BCG SENT TO ARDROSSAN, SCOTLAND, THE FIRST MESSAGE TO SPAN THE ATLANTIC ON SHORT WAVES. 1BCG, AN AMATEUR STATION, WAS BUILT AND OPERATED BY MEMBERS OF THE RADIO CLUB OF AMERICA."

Responding to a 1948 recommendation of the Awards Committee of The Radio Club of America, the club's board of directors approved the construction of this marker and the presentation of a replica of the Armstrong Medal to the seven members of the club who were involved in this special achievement.

In 1950, the club recorded the story of the building and operation of Station 1BCG and the sending and receiving of the first transatlantic short wave radio message in a specially authorized *Commemorative Issue of the Club Proceedings.* This publication is a treasure trove of information on the design challenges, operating frustrations, personal commitments, and press coverage of this achievement.

As Edwin H. Armstrong noted in the booklet, "The plan was simple. American amateurs were to transmit, British amateurs were to receive — and an American amateur, Paul Godley, was to be sent abroad with his own receiving equipment in an attempt to guard against a repetition of the failure of similar tests in the preceding year, when signals sent from the United States remained unreported from Britain."

The six-man operating and engineering staff of 1BCG included Armstrong, Ernest V. Amy, George E. Burghard, Minton Cronkhite, John F. Grinan, and Walker P. Inman. Amy and Burghard contributed



Tim Walker, N2GIG, coordinator of the event, stands by the monument erected near the 1BCG transmitting site by The Radio Club of America.

"The History of 1BCG" to the booklet. They note that in 1920, amateur operation was limited to 200 meters and down because these so called "short waves" were believed to be of little value for long distance communication by government and commercial interests.

Some highlights from the 1BCG story include:

• 1BCG was constructed specifically for 1921 ARRL transatlantic test and won the prize as the best station.

• The team constructed a T-type antenna with a 100 foot horizontal cage flat top made up in two sections, each 50 feet long with eight #14 stranded phosphor bronze wires equally spaced around 18 inch diameter metal hoops and connected from the center point with a 70 foot downlead to the transmitter.

• They also constructed a counterpoise consisting of 30 radial wires, each 60 feet long, extending from a common central point at a height of seven

feet above the ground. To reduce resonance effects, the system was designed with two equal fan shaped halves, each with 15 wires.

• The original transmitter utilized two UV-204 Radiotrons in a self-excited, self-rectifying Colpitt's oscillating circuit, which required an 8,000 volt center-tapped plate voltage transformer, with a primary operated from 110 volts A.C. A step-down transformer lit the filaments of the tubes, 11 volts at 3.75 amps each.

• The transmitter was rebuilt in the field to use a master oscillator power amplifier arrangement in order to avoid the self-excited oscillator disadvantages and produce a pure, steady CW signal for ideal heterodyne tone reception. One UV-204 was the oscillator and was direct coupled to three more 204s in parallel in the amplifier. Two thousand volts D.C. from a motor generator set supplied the plate voltage.

Transmitting "shack" to be used for the special event, provided by George Wells, KA1JUV, is very close to the original site.

• The tests started on Dec. 7 and after many tries, a message was received in Scotland on Dec. 12 at 3 a.m. GMT as follows — "Nr 1 NY ck 12 to Paul Godly, Ardrossan, Scotland. Hearty Congratulations. Burghard Inman Grinan Armstrong Amy Cronkhite."

The station was dismantled on Dec. 29, 1921, and the transmitter moved to Columbia University for exhibition at a reading of a paper before the Radio Club of America. All the technical data in this paper is covered in a special section of the 1950 booklet. Nobody knows what happened to the transmitter after that event.

In honor of the 75th anniversary of this historic transatlantic transmission, a special events station will be set up to operate from Greenwich Dec. 11 through Dec. 15, 1996. A replica of the original transmitter built by Bob Raide, W2ZM, of the Antique Wireless Association (AWA), will be on the air from a location close to the original site in Greenwich. This rig will be on the air starting at 2300 GMT Dec. 11 on or about 1815 kilocycles, which is as close as practical to the original frequency of 1350 kilocycles. The call used will be W1BCG.

The organizers for the event with the support of the ARRL are the AWA (Bloomfield, NY, Bill Fizette, K3ZJW, president), Greater Norwalk Amateur Radio Club (Norwalk CT, Ed Ashway, W3EIN, president), Shoreline Amateur Radio Club (Waterford, CT, Sandy MacLean, N1MUS, president) and Stamford Amateur Radio Association (Stamford, CT, Jim Murdock, N1NNG, president). The organizers are grateful to George Wells, KA1JUV, of Greenwich, who is providing the "shack" for this operation at a site that is close to the original location used by 1BCG.

Event coordinator, Tim Walker, N2GIG, has heard from the AWA that the RSGB and REF (British and French equivalents to the ARRL) that hams in these countries want to participate in the special event. Since the original transmissions were directed to the UK and Europe, extra efforts will be made to involve these operators.

See the Amateur Radio Column in this issue for details on W1BCG's scheule.

ABOUT THE AUTHORS

• Bruce L. Kelley, W2ICE, was first licensed as W8ACY in 1929. He has been a member of ARRL since 1929. He was educated at the University of Rochester and is now retired from the engineering department of Eastman Kodak. Kelley was one of the co-founders of the Antique Wireless Association in 1952. This group is dedicated to the task of collecting and maintaining the history of radio. Kelley is the curator of the AWA Museum in Bloomfield, NY, and received a special award from the Radio Club of America for excellence in historical documentation. He is scheduled to present a status report on this special event at the RCA November meeting. He lives with his wife in the town of Bloomfield, NY, near Rochester.

• Donald G. Hudson, KA1TZR, was originally licensed as W9BLM in 1946 while in the Air Corps in Hawaii. He started operation from Evanston, IL, where he attended the Northwestern Technological Institute. While in the cooperative work study program there, he was employed as an engineering trainee at Hallicrafters. After receiving an MBA at Northwestern, he was subsequently employed by Procter & Gamble and later by Booz, Allen & Hamilton and Towers, Perrin, both management consulting firms. Now in retirement, he has returned to his electronic roots, collecting Hallicrafters products and repairing Hallicrafters equipment for other hams as a labor of love. He lives with his wife in the town of New Canaan, Connecticut near Stamford.

AMATEUR RADIO

By Bruce Kelley, W2ICE
59 Main Street, Bloomfield, NY 14469
Please include SASE for reply.

OT TRANSMITTING CONTESTS

By popular demand, we've increased the number of events when one can take the old-time transmitter off the shelf and work fellow members. See the schedules below.

As a starter, the new 20-40 Meter DX Weekend will allow East and West Coast (and DX) members to try to make contact. The 1929 QSO Party has two important changes: the event has been expanded to two weekends with transmitters in two groups: self-excited and MOPAs. Be sure to indicate type of transmitter on score sheets.

The new 160 Meter QSO Party provides an opportunity to work fellow members on our oldest band. No restrictions on equipment. The schedule for our regular OT contest will also be found below. And most important, don't overlook your chance to work W2ZM operating the replica 1921 BCG transmitter using the call W1BCG. This event is featured in the December '96 *QST*.

OT DX PARTY

Saturday and Sunday, Nov. 9-10, 6 p.m. to 6 p.m. EST. Operation near 7040 and 14060 kc. Send: RST, TX and RX year. Same rules and score sheets as regular OT contest.

1929 80-METER QSO PARTY

Saturday-Sunday, Dec. 7-8, Saturday-Sunday, Dec. 14-15, 6 p.m. to 6 p.m. both weekends. Restricted to 1929 (or earlier) design self-excited or MOPA transmitters. No mods. Power must be 10 watts or less. Operate on or near 3590 kc. Send: RST, power input, year and type of transmitter.

160-METER QSO PARTY

Friday-Sunday, Jan. 3-5, 1997, 6 p.m. to 6 p.m. Operation: 1815-1825 kc. CW with less than 100 watts. Exchange RST, TX year and handle. Mods allowed.

Send ALL score sheets to: Bruce Kelley, W2ICE, 59 Main Street, Bloomfield, NY 14469

REGULAR OT CONTEST (20 THROUGH 160M.)

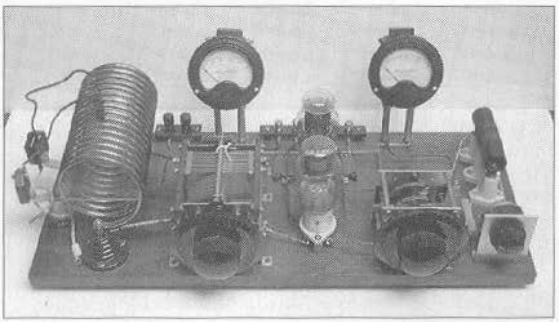
Wednesday-Thursday, Feb. 26-27, 1997, 6 p.m. to 6 p.m. Saturday-Sunday, March 1-2, 1997, 6 p.m. to 6 p.m. Same rules as in previous years. Details in February *OTB*. Score sheets available from Mike Raide, KF2MW, PO Box 181, Bloomfield, NY 14469

AMATEUR NETS

Now that fall is here again, let's reactivate our several amateur nets. True, the 11-year cycle hasn't helped matters, but let's give "20" a try this winter. Complete net schedule will be found in the AWA news column.

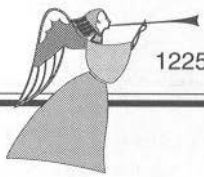
SPECIAL EVENT STATION ANNOUNCEMENT

Greenwich, CT. Celebrating 75th anniversary of the transatlantic tests. In December 1921, 1BCG became the first amateur station to send a complete message across the Atlantic using low power and short waves. Observing this anniversary, W1BCG will be on the air from almost the same location from 2200 Z on Dec. 11 to 2400 Z Dec. 15, 1815 KC CW only, using an exact replica of the original transmitter, and also on December 13-15 on 80 to 10 meters, all modes. QSL to SARA, PO Box 4225, Stamford, CT 06907-0225, USA. Send large or 9x12 SASE for certificate. See feature article in the December 1996 *QST*. Contact persons: Tim Walker, N2GIG, (203) 454-4376; Bruce Kelley, W2ICE, (716) 657-7489.



Here's the transmitter that won this year's OT contest for Ralph Thomas, W2UK, who became a silent key before learning he had won. It was built by craftsman John Rollins, W1FPZ.

Recent Radio, TV and Entertainer Obituaries



Compiled by Charles S. Griffen, W1GYR
1225 New Britain Ave., West Hartford, CT 06110-2405

Note: When known, the date of death is indicated in parenthesis, i.e. (1-31-96)

• **MEL ALLEN**, 83, (6-16-96) sportscaster. He was known as "The Voice of the Yankees" and worked in the team's television and radio booth for 25 years and was at the microphone for 20 World Series games. He was replaced by Phil Rizzuto in 1964 but continued working on NBC's *Game of the Week* and a syndicated show entitled *This Week in Baseball.*

• **JOHN W. CHANCELLOR**, 68, (7-12-96) retired reporter, anchorman and commentator. He was associated with NBC from 1950 until 1993 except for the period 1965 to 1967 when he headed the Voice of America. He began his career with NBC in Chicago and subsequently was assigned to its offices in Vienna, London, Moscow, Berlin and Brussels. Chancellor was anchor or co-anchor of *The NBC Nightly News* from 1970 to 1982. In 1983 he became a commentator for the broadcast, continuing until his retirement in 1993.

• **VIRGINIA CHRISTINE**, 76, (7-24-96) character actress. She appeared in more than 400 pictures and TV shows but will always be remembered as "Mrs. Olson" pouring Folger's coffee in their advertisements. Film credits include *Cyrano de Bergerac, High Noon, A Rage to Live,* etc.

• **CLAUDETTE COLBERT**, 92, (7-30-96) stage, film and TV actress. She appeared in 64 films from the dawn of sound to the early 1960s. In 1934 she earned an Oscar for her performance in Frank Capra's *It Happened One Night.* Other film credits include *I Met Him in Paris (1937), The Palm Beach Story (1942), Since You Went Away (1944), Three Came Home (1950), Parrish (1961),* etc.

• **THOMAS H. DAWSON**, 82, (6-2-96) former president of the CBS television network. He joined CBS in 1938 and was named president of CBS television in 1966. He left CBS to become director of radio and television in the commissioner's office of Major League Baseball. Dawson retired in 1974.

• **JOANNE DRU**, 74, (9-10-96) actress. She was the heroine of 1940s and 1950s Western films including Howard Hawks' classic *Red River* (1948). Other film credits include *She Wore a Yellow Ribbon* with John Wayne, *Wagon Master, Light in the Forest* with Fess Parker, *Return of the Texan* with Dale Robertson, *The Warriors*, etc.

• **HERB EDELMAN**, 62, (7-21-96) character actor. He played the part of Stanley Zbornak, the ex-husband who always needed a loan or place to stay, in *The Golden Girls.* Edelman appeared in the stage and film versions of Neil Simon's *The Odd Couple.* He most recently guest-starred in the television series *Murder, She Wrote.*

• **ELLA FITZGERALD**, 78, (6-15-96) singer. Her vocal style and popularity spanned five decades and gained her the title "First Lady of Song." She began her singing career with the Chick Webb Band in 1935. In 1938 they recorded their first hit, "A-Tisket, A-Tasket." In 1942 she began a solo career that included supper clubs, concert tours, movies, TV specials, etc. Fitzgerald recorded some 250 albums and won 13 Grammies.

• **J. JERRY FREEMAN**, W4JL 63, (5-18-96) FCC engineer. He was associated with the FCC for 35 years, many of them as engineer in charge of its Norfolk, VA, Field Office. He retired in August 1995.

• **BILL MacPHAIL**, 76, (9-4-96) pioneer in the development of TV sports. He joined CBS in 1956 as Sports Director and remained there for 18 years. When he left to join CNN he was VP for Sports. MacPhail oversaw the development of the first network sports anthology, CBS *Sunday Sports Spectacular*, and the instant replay (Army-Navy game in 1963). He was associated with CNN for 16 years and retired in 1995 as senior VP of CNN Sports.

• **ROSS MILLER**, radio personality and executive. He joined the staff of WTIC (Hartford, CT) in 1945 and held various on-air and management positions until his retirement in 1993. During the 1950s he had regular musical programs and interviewed big band, screen and stage personalities. He retired as VP of WTIC-AM.

• **GREG MORRIS**, 61, (8-27-96) film and stage actor. After several guest appearances in *The Twilight Zone* and *Dr. Kildare* he became one of television's first black stars with his role as electronics expert Barney Collier on *Mission: Impossible*, which ran from 1966 to 1973.

• **SIR NEVILL MOTT**, 90, (8-8-96) pioneer in semiconductors. He was a founder of the science of solid state physics and performed much of the pioneering work in the 1930s and 1940s which led to transistors and today's information technology. He headed the Cavendish Laboratory at Cambridge University from 1954 to 1971. In 1977 he shared the Nobel Prize for physics semiconductor research.

Continued on page 64

CLASSIFIED ADS

Old-time ads are free to members collecting and restoring equipment for personal use. Please observe the following: (1) one ad per issue per member; (2) include a SASE if acknowledgement is desired; (3) material must be more than 25 years old and related to electronic communication; (4) give your full name, address and zip code; (5) repeats require another notice (we are not organized to repeat automatically); (6) the AWA is not responsible for any transaction; (7) we retain the right to reduce an ad's size if over seven lines; (8) AWA does not accept commercial advertising in this column; and (9) the deadline for ads in the February issue is Dec. 8, 1996. Ads received after that time will be held for the following issue. Mail all ads to:

Richard Ransley, Box 41, Sodus, NY 14551

SELL/TRADE — BC/SW TUBE RADIOS

Best offers on the following: DeForest Everyman crystal set; Crystal set kit in original box; Aeriola Sr.; Canadian Marconiphone II; Crosley Models 51 and 52; Radiola III and IIIA; Atwater Kent breadboard Model 9; National SW-3 w/coils; National SW-5 w/coils; Browning Drake; Stromberg Carlson, Model 601. Aaron Solomon, VE1OC, 8 Crichton Park Road, Dartmouth, Halifax, Nova Scotia, Canada B3A 2N8 (902) 466-5188.

Priess Straight Eight without loop antenna, $200.; Hallicrafter SX110, $100; GM "Little General", professionally restored, $250.; Grebe MU-1 Syncrophase, w/copy of manual, $250.; G.E. M-51 Tombstone, $125; Guild Conquistador (chest-type, rare), $125; Gloritone 26, cathedral, $125; Zenith "My Radio" ultra-miniature transistor Model RD-14 in unopened original box., $125; RCA Stratoworld portable, 7 BX-10, nice, $100.; Silvertone portable Model 7224, $60; GE portable P-4990-A, 12 bands, pristine, $75; Zenith Royal 3000-1 extremely clean, $125. All plus shipping. Ernie Nagy, PO Box 822, Elk Rapids, MI 49629 (616) 264-9412.

Magnavox Model T-6, single dial, TRF battery radio, 6 tubes, complete less speaker, radio is in pull-out "drawer" in drop-front tabletop mahogany cabinet circa 1926, $85. Curt Brohard, 1417 Court St., Alameda, CA (510) 521-4299.

SELL/TRADE — COMMUNICATIONS GEAR

HRO 60 rack mount with A, B, C, D coils and speaker in exc. working condition , $250; Hallicrafters S36A RBK15 w/manual, in exc. working order, $225; Hallicrafters 10" speaker, exc., $50; Hallicrafters SX101A w/manual in exc. working cond., $225; Pair of Motorola Handi Talkies Radiophone Model H23-7, $125 for pair. All plus UPS. Phil Guinan, 106 Page Rd., Litohfield, NH 03052 (603) 889-6213.

National FB-7A receiver with 80/40/20 meter coils. Good condition. Tom Brent, Box 1552, Sumas, WA 98295 (604) 826-4051.

National NC-173 receiver, w/manual, $125; Federal 101 receiver, w/manual; military TA-264/PT field phone; TS-183V Battery Tester; C1306/GRA14 Control Box and TU-51 (BC-610). Mel Stoller, K2AOQ, 100 Stockton Lane, Rochester, NY 14625 (716) 671-0776.

SELL/TRADE — GENERAL

Large list of radio/electronic items. Email bk296@freenet.carleton.ca for free copy or send $1. bill (refunded with order) for printed copy or diskette (specify 3.5" or 5.25") Gordon Symonds, 26 Ossington Ave., Ottawa, Ontario, Canada K1S 3B4 (613) 730-2198.

Electricity/telegraph and radio books and magazines 1895-1935, assorted wireless items and early tubes, etc. SASE for list. Jan Perkins, 524 Bonita Canyon Way, Brea, CA 92821.

Grundig tube type stereo system: Four band receiver with ECHO, three speed phonograph, 7 in. reel to reel tape, separate chassis 50 stereo tube amplifier/power supply, six loudspeakers, above removed from 6 foot console cabinet. Also a Barzilay wlanut three piece entertainment console for 15" loudspeakers w/Tambour doors. Francis Yonker, 1229 Inverary Place,

State College, PA 16801 (814) 87-1400.

Have (2) tube type car radios. SASE for description. John Uscinowski, RR 1, Box 379, Greenwich, NY 12834-9519.

Horn-type phonographs, parts and records available. Also looking for same including phonograph collections. Tim Fabrizio, PO Box 10307, Rochester, NY 14610 (716) 244-5546.

Marconiphone A and Gecophone II crystal sets; Bodine loop aerial; Turtoiseshell Burns horn; NIB transistors; HMV Monarch Junior; gold Airline and rainbow 01-As, AK 10B; Mercury Super 10; RCA plexiglass illuminated sign; Sony and other transistor radios, mostly in the box; Marconi ship's medecine cabinet, Marconi bust; NE/Victor R-50; NE R-4. A. R. Nolf, VE3NLF, 539 Kastelic Place, Burlington, Ontario, Canada L7N 3S9 (905) 333-4557.

QSTs 1968 to 1975 in 8 QST binders like new, $9 per year plus shipping; 1000s of old radio parts. Write with your wants. SASE for reply. Frank Krantz, 100 Osage Ave., Somerdale, NJ 08083-1136.

RCA Radiola 60, exc., $60; King radio "Berlinetta", wood cabinet, single dial battery, exc., $125; Zenith art deco style bakelite table radio Model 5R317, good, $75; deForest-Crosley (mid '30s) table radio, burl walnut veneer & wood cabinet with inlay, very nice, $100; Philco 86, highboy, exc., $200. All $US, you pay shipping. Richard Marlow, 4 Corbett Ave., St. Catharines, Ontario, Canada L2N 5M4 (905) 934-9378 (905) 566-9265.

RCA Model 19K chassis and parts and Philco Model 38-4 chassis. Chris Russo, 34 John Street, Red Bank, NJ 07701 (908) 842-8939

Reducing collection of 1930-1970 radios - bakelite, wood, sw, European AM/FM/SW table models, transistors; also reel-reel tape recorders, old TVs, Hi-Fi & stereo equip., old medical devices, turntables, Hammarlund Super-Pro, etc. Make offers. Send 2-stamp SASE for list. Rick Wolfson, 610-G Youngs Rd., Amherst, NY 14221 (716) 895-5447, (716) 676-2455 or (716) 833-7270.

SELL/TRADE — KEYS & TELEGRAPH

Latest revision of my surplus military and other telegraph items. 16 pg. illustrated list. $3 + 2 stamps ($5 refund w/$20 purchase). Joe Jacobs, 5 Yorktown Place, Fort Salonga, NY 11768.

SELL/TRADE — LITERATURE

1928-43 European radio schematics. More than 1,300 pgs., more than 1,400 schematics (bound), $100. Air mail shipping to US, $30.; Early European tube books on Tungsram, Purotron, Radio tube Vade-Mecum. All books photocopies. Trades welcome. Need 1930s European radio schematics by W. A. Schenk, Vol. 1 and 2. Will buy or trade original books or copies. Argirios Adomidis, Kampouridi 19, Panorama, Thessaloniki, Greece 55236 (031) 342405.

Old radio books 1907-1950, magazines, catalogues, receiving and transmitting tube manuals, Rider's indexes, early TV literature. Cathedral, tombstone, bakelite and novelty radios. SASE for large list. Patrick Henry Jr. crystal set, $395. McMurdo Silver 1934 radio product line catalogue with personal letter signed by McMurdo Silver., $200. Bill Rolf, 30131 Center Ridge, Westlake, OH 44145 (216) 871-4547.

Radio magazines, books, catalogs, ARRL Handbooks, "Radio" Handbooks, ham gear manuals, CB manuals, test equipment manuals. Al Bernard, PO Box 690098, Orlando, FL 32869-0098 (407) 351-5536.

Rider Basic Transistors, 1961, $15; Rider Basic Electricity, $ Vol. first edition set, 1954, $35; Book Radio Boys at Ocean Point, $15; Postcard CBS Television City, Hollywood, 1950s unused, $4; nice framed original photo of a 1940s radio repair shop, $30; Book Don McNeill Breakfast Club 20 Years of Corn, 1953 w/ lots of pictures, $25; Aunt Sammy's Radio Recipes published by US Dept. Of Agriculture, 1927, $18; WLS family album Centennial Edition, 1941, $20. R.C. Moore, 200 73rd Ave., N. #314, St. Petersburg, FL 33702 (813) 527-4635.

SELL/TRADE — PARTS

Galena crystals, parts, radios, etc. Leonard Gardner, 458 Two Mile Creek Road, Tonawanda, NY 14150.

Western Electric #100-E loudspeaker (with amplifier). This model is much older than the #100-F. Works nicely, wood cabinet needs refinishing, $60 + UPS. C.F. Crandell, 3412 Rugged Drive, Dallas, TX 75224 (214) 337-2823.

SELL/TRADE — TEST GEAR

Frohm frequency Meter; J.G. Biddle Co., lovely wood case, $200; Syncro Tester MK-2 Mod-3; Ford Inst. Co. (Untested), $100; Roller-Smith 300 amp., 50mv, current shunt (untested), $50; Precision Radiations Inst. Inc. Geiger Counter 107-C (untested), $100; Triplett 337-AVP, 3 Phase "Polarity-Voltage-Phase

Rotation" meter, $100; Tracerlab #42 X-ray Syncronous Motor Timer, 0 to 60 seconds and 0 to 60 minutes, $50; Hetrodyne Frequency Meter LM-10 w/charts, Bendix Radio, $200; Crystal Rectifier Test Set TS-268/U, $50; Precision Mod. 612 tube tester in lovely birdseye maple case, $200. All plus UPS. Chuck Bray, 1322 Ivy Rd., Bremerton, WA 98310 (360) 373-1013.

SELL/TRADE — TUBES & TRANSISTORS

(1) Developmental 15GP22 RCA CRT, $100; (1) Lawrence Chromatron experimental color CRT, $100; (2) 1850A Iconoscope tubes, 1 NIB, 1 pullout in original box, $200 ea.; (1) RCA TK11 I. O. Camera chain complete, $400; (1) RCA TK44 color camera chain complete, $100; (1) Philco Predicta G-4654 television, $200; (2) #891 tubes, $50 ea.; (1) 892 tube, $50. Bob Hodge, 406 Lexington Ave., Syracuse, NY 13210 (315) 478-0359.

Large stock (over 10,000) of European valves from 1924 upwards. Most of them in original boxes. Brands includes Philips, Valvo, Mullard, Lorenz, Telefunken, Tungsram, Siemens, Brimar. Also have ECC807 from Brimar. Will attempt to locate your needs. Send self addressed envelope with your requirements. John Post, 26 Karri Ave., Karana Downs, Qld. 4306, Australia ph/fax 61.7.32010087.

WANTED — COMMUNICATIONS GEAR

Hallicrafters HA-5 VFO; WRL CW-7 xmtr; Brown Brothers straight key; assembly manual for Heathkit EK 2A regenerative rcvr (1961); Dow key bug; International xtal 80-40 meter xmtr.; Philmore CR5A rcvr. Please help me complete my novice station. Gary Wagner, K3OMI, 11124 Oak Hollow Rd., Knoxville, TN 37932 (423) 690-4217 days M-F.

HQ-160 or HQ180. Dick Neish, W0SIR, Box 100, Chester, SD 57016-0100.

WANTED — GENERAL

A German friend is looking for any examples of the Westrex or Tefi sound stape cassettes, technical & advertising literature and their players (vintage 1953-63). This is a nonmagnetic, endless loop cassette with the audio tracks embossed into the tape and played by a needle pickup. Robert Lozier, 600 E. Green St. Monroe, NC 28112 (704) 283-2638.

Brown bakelite end cap with metal bracket for RF coil on Atwater Kent 10C breadboard. David Cheney, 338 Arlington Cres., Beaconsfield, Quebec H9W 2K3, Canada (514) 694-3240.

Cabinet or parts set for Globe Chief Xmitter. Have for sale a bag of 200 NOS resistors, $1 + 1 lb. shipping. Dave Dameron, KG6BP, 819 Boundary Place, Manhattan Beach, CA 90266-6621.

Cabinet for RCA Little Nipper Models 9SX1 to 9SX8, or willing to sell my working chassis for same. Also still looking for service info. for McMurdo Silver Masterpiece V as advertised in Aug. 96 issue of OTB. Irvin Sanders, RR 3, Box FA53, Harrisburg, PA 17112 (717) 469-2185.

Cabinet for Philco Model 20 and metal escutheon for Model 70. Also chassis for AK 558. Walt Wrobek, Rt 4, Box 370, Menahga, MN 56464.

Harvey-Wells R9/R9A, T90, ASP90, P.S. Ten-Tec Model 315 , Mosley CM-1, RME 50/50A, RCA AR88D, McMurdo-Silver 801/801B W/coils. State price and condition. Herman Schnur, RR 3, Box 151, Greenville, NC 27858.

Ross Communications receiver by A.H. Ross and Co.; Radio Phone Boys books by Roy Snell; Wireless Patrol and Young Wireless Operator books by Lewis Theiss. Alan Reed, 2875 Geneva Highway, Manitou Beach, MI 49253 (517) 547-7570 evenings.

Small 1920s radios, small cathedrals, spark transmitter parts, WD-11 tubes (dud). Argirios Adamidis, Kampouridi 19, Panorama, Thessaloniki, Greece 55236.

WANTED — INFORMATION

I am researching the radios manufactured in Colorado and would appreciate any information about the following radio companies and their products: REYNRAD (Reynolds Radio Co., Inc.); A & M Radio; Buckwalter Radio (Supertone Radio Co.); Madison Moore Radio; Pyle-Amplex Radio and Nollenberger & Dorner. Will pay postage, collect calls and reproduction costs. All help is appreciated. Please contact Wayne Gilbert, 10751 Routt St., Broomfild, CO 80021 (303) 465-0883.

Information on a radio tester called Rimco Dynalyzer. It is set up to check RF and AF parts of a radio, has one meter in the center (illuminated) and 10 knobs. Made in Jackson, MS in approx. 1940 and is 15½" wide, 10" high, 7½" deep. Ray Larson, 12241½ Gorham Ave., W. Los Angeles, CA 90049-5214.

Manuals or info on Sola adjustable DC power supply #28540, Gonset 4 tube auto SW converter, Philco remote control for console radio. Copying/postage reimbursed. Thanks! Chuck Porter, 1934 5th Avenue, Troy, NY 12180.

Tech manual, schematic, or any information on a Model GF-11, CW-52063A Navy aircraft transmit-

ter. Looks like a BC-230 or 430 but has different tubes. Wayne LeTourneau, PO Box 62, Wannaska, MN 56761 (218) 425-7826.

Writing article — information and photos are needed on 1946-50 manufacturers of plywood radio enclosures (cabinets) made by Evans Molded Plywood Co. of Los Angeles, CA and Zeeland of Detroit, MI. Also looking for information or example of plastic Zenith Radio-Nurse speaker or info on Stephans Speaker Co. in Los Angeles 1956-1962. Thanks. Steven Cabella, 500 Red Hill Ave., San Anselmo, CA 94960 (415) 461-6810.

WANTED — KEYS & TELEGRAPH

Old or unusual telegraph items from oddball manufacturers. Keys before 1870, rare bugs such as 90 deg., left-handed, vertical, miniatures, juniors, etc. and weight driven registers. I do have some good traders. Gil Schlehman, 335 Indianapolis Ave., Downers Grove, IL 60515.

Telegraph equipment — collector wishes to purchase or trade Morse-related items such as keys, bugs and sounders, etc. SASE for my list of trade items. Dave Pennes, 4607-C Santa Cruz Dr., Indianapolis, IN 46268-5354 (317) 471-9605.

Want for a Model 14 teletype paper tape 3/8" wide roll or info where I could obtain same. Albert Meyers, 12 Greentree Lane, Dover, NJ 07801-4420 (201) 989-5203.

Want early McElroy code oscillator with lightbulb ballast and two tubes; late one-tube AC oscillator; Mac Keys; pre-WWII literature; anything else by T. R. McElroy. Tom French, W1IMQ, "The McElroy Collector", 151 Barton Road, Stow, MA 01775 (508) 562-5573.

WANTED — LITERATURE

Citizens Radio Amateur Callbook magazines for spring and fall 1925. Bob Arrowsmith, W4JNN, PO Box 166, Annandale, VA 22003 (702) 560-7161.

CQ 1945, 1946 whole issues, Aug. 1976, Sept. 1977 or whole issues; HR Jan., Feb. 1968, Aug. 1970, May 1971, July and Aug. 1974 or whole issues. QST 1923 and 1924 whole issues. Dong-Hyun Cho, Biology Department, Kang Won National University, Chun Chon 200-701 S. Korea. E-mail: DHCHO@cc.kangwon.ac.kr.

Need Volume 4 of AWA Review. Will trade Vol. 7, if you wish. Marvin Moss, Box 28601, Atlanta, GA 30358.

Sylvania How to Service Radios With an Oscilloscope (ca 1950), RCA HB3 Electron Tube Handbook, GE looseleaf Tube Manuals. Peter Keller, KG7YF, 7445 S.W. Bayberry Drive, Aloha, OR 97007.

Wanted for my collection the following ARRL Handbooks: 1st edition, 5th, 14th, 19th and 20th, in good condition. Robert Schafer, WA7IHN, PO Box 442, Aumsville, OR 97325 (503) 749-1149 after 5 p.m. PST.

Want General Radio Experimenter issues: Nov., Dec. 1934; Jan., Feb. 1935; Apl. thru Dec. 1936; Jan. thru Dec. (except Feb.) 1937; Aug., Sept. 1938; Jan., Aug., Sept., Dec. 1939; Jan./Feb., Mar./April, May/June, July/Aug. 1969; Oct. thru Dec. 1970 and any since then. Also want General Radio catalogues "A", "B", "C", "D", "G-2", "I", "L". Also want catalogues & literature from Ernst Leitz and Wetzlar on microscopes, optics, etc. John Field 2335 Benton St., Santa Clara, CA 95050-4432 (408) 246-1383 weekends & evenings.

Microcomputer Design by Donald Martin, 1976 and Digital Computer Electronics by Malvino. Have Boy's 1st Book of Radio & Electronics, by A. Morgan for trade. Dave Dameron, KG6BP, 819 Boundary Place, Manhattan Beach, CA 90266-6621.

Radio Boys books by Chapman with dust jackets. Henry O'Meara, 42 Aqua Ra Drive, Jensen Beach, FL 34957.

WANTED — MILITARY

Clean BC-348, prefer with 110 VAC power supply. Dick Neish, W0SIR, Box 100, Chester, SD 57016-0100.

German WWII gear including "resistance" clandestine sets, suitcase sets, etc. and crypto equipment from all periods. Working condition is not imperative. Rag Otterstad, LA5HE/OZ8RO, Hosterkobvej 10. DK-3460 Birkerod, Denmark Phone 45-4281 5205.

WANTED — PARTS

Cabinet, including the back containing antenna for Emerson Model 5471. Also need a schematic for a Starlite Radio Model T0820. James Maloney, 1703 Leno R.D., Macedon, NY 14502.

Cabinets for Philco Models 95 and 118, or will sell chassis; chassis for Philco Model 60, or will sell cabinet. Have for sale a Philco Model 60, Philco Model 84B and Hallicrafters Model SX-110. All in excellent condition. Dale Johnston, 1305 Guadelupe Drive, Westminster, MD 21157 (410) 848-5279.

Case or lid for Zenith 7G605 Clipper and gray Wavemagnet for Zenith H-500 Transoceanic. Carter Elliott, 1460 Pinedale Rd., Charlottesville, VA 22901 (804) 979-7383.

Help! Need plug-in coil set and parts to restore water damaged 1946 National HRO-5A1. Any 1946 HRO or earlier coil part including "junk" coils will be appreciated greatly. Especially need D, E and F coil sets. Will answer all letters. S. E. Walkins, 13003 Fennimore Terrace, Midlothian, VA 23113-4482..

Western Electric speakers/amps/trans/tubes, Brook, ALTEC amps/speakers, UTC amps/trans, large EV/JENSEN/JBL speakers, Mike Somers, 2432 W. Fargo, Chicago, IL 60645 (312) 338-0153.

Need two working transformers for Grebe Synchrophase to replace my "duds." Also three identical "slow drive" units (they are beneath the main drives on the panel) for Paragon RA-10. Alternatively, is there a good Samaritan who could lend me a drive so I could get it copied (or arrange to get their drive copied in the States)? I already have the nickeled panel mounting plates. Dr. W.D. Hackmann, Sycamore House, The Playing Close, Charlbury OX7 3QP, United Kingdom. Tel: 01608 811110. E-Mail: willem.hackmann@histsciu.ox.ac.uk

WANTED — BC/SW TUBE RADIOS

Want following restorable tombstone radios: Zenith 8S129, 10S130, 6S137, 7D138, Philco 16B (early version), 116B (early version). Any condition, basket cases OK. James Fisher, 344 Harrison Ave., Manville, NJ 08835 (908) 725-7476.

WANTED — TUBES & TRANSISTORS

Early 1950s new in package transistors for display. Larry Daniel, 706 Pearson Rd., Wright Patterson AFB, OH 45433 (515) 754-1567.

— BOOK REVIEWS

Continued from page 55

some with cat's whiskers. 24 pages are devoted to reproductions of crystal detector advertisements. One over the name of Central States Engineering Co. of Chicago pictured an "R-W Self Adjusting Crystal Detector" at $1.50. This was a "multi-contact detector that will always find a live spot....50% more volume.....out the sliding arm and let go.....contact always locates itself on a sensitive spot."

Finally, the book contains a table organizing commercially offered crystals (pre-1929 through 1959) by manufacturer, trade name, price and year offered.

— RESTORATION COLUMN

Continued from page 45

voltage, so I thought nothing of it. Next I put the battery on the AVC line. The i.f. and r.f. voltages were correct, but the converter signal grid was still positive. That was the tipoff. The 2100pF mica coupling cap between the r.f. plate and the converter signal grid was leaky.

I usually don't find that type of failure in mica caps, but after replacing this one, the set came to life. I'm not sure why a positive voltage on the control grid stopped the oscillator section of the tube. *[Ed: This is rare. I have seen only one shorted mica cap in 50+ years of radio work.]*

HELP!

A tube I pulled out of an old three-dialer has an untipped "S" bulb with a Bakelite, short-pin UV base. Plate and filament characteristics are those of a Type UV201A. On the bulb, which is completely opaque with metallic getter deposit, is etched the word, "RESEARCH." On the bottom of the base, centered between the pins, is the monogram shown. There are no other markings of any kind. Does anyone know who made this tube?

— OBITUARIES

Continued from page 59

• **BEN OLIVER**, AA3Y (ex-2CJR and W2CJR), 89, telephone company engineer and executive. He joined the Bell System in 1928 as an engineer with the New York Telephone Company and ended his career with AT&T as Vice President, Government Communications. Long Lines Department.

• **JACK SLATTERY**, 75, (9-3-96) radio talk show host. In the Rochester (NY) area he was known as the "dean of radio" for his more than 40 years of work on the radio, 32 of which were spent at WHAM(AM). His last show was aired in 1988.

• **HAROLD A. WHEELER**, 93, (4-25-96) former chairman of the Hazeltine Corp. He directed development of a mine detector and an extensive series of antennas for electronic identification, and conducted seminal theoretical work on microwave transmission lines and antennas that were applied to radar guidance and defense systems. He is credited with over 180 patents and 100 scientific papers.

Information for this column was obtained from *The Boston Globe, Broadcasting and Cablecasting, The Hartford Courant, The New York Times, QCWA Journal, QST* and *Variety.* Thanks to Don Andrus, Leonard Aquilino, Jr., Lewis M. Owens, Allan Sherry, and Bob Thomas, W3QZO, for additional material.

Business Card Ads

The *OTB* is now accepting business card ads at the special low, low, introductory price of $12 per issue. Send us a copy of your business card, or a special typeset ad designed to fit our standard space. We can, alternatively, typeset a short message for you (no more than eight lines, 50 characters max per line, please). For the time being, there will be no charge for typesetting. All ads must be for radio-related items or services and must be paid in advance. Send your ads and checks (payable to AWA) to Kevin Carey, Advertising Manager, *OTB*, PO Box 56, West Bloomfield, NY 14585. Closing date is six weeks prior to first day of month of issue.

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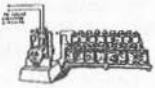

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THE MUSEUM

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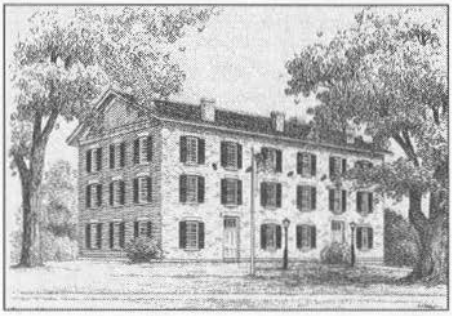
ATTENDANCE HITS HIGH

The 1996 season saw Museum attendance hitting an all-time high with visits by many groups: radio clubs, senior citizen bus trips, school and scout groups, antique car clubs among them. When practical, visitors were also given a tour of the Annex, which houses a large collection of military equipment, BC receivers, tubes, as well as a unique television display. This TV exhibit, which is in the new addition, we plan to complete this winter.

Among the new exhibits, one small area draws much attention: it's an operational 1890 Crowfoot primary cell battery using blue vitriol, or copper sulfate. Its preparation was a challenge to Jack Wenrich, who obtained the necessary chemicals and has the Crowfoot on display with a voltmeter and a small lamp acting as load. These cells were commonplace in telegraph offices for nearly 75 years.



On the subject of the addition, I personally want to thank our many friends for their contributions to the Museum Monetary Fund. A big THANK YOU! The fund is carefully handled by our treasurer and will be used for current and future construction and maintenance.

We are frequently asked if the Museum auctions accessioned items. The answer is no. As put forth in our charter, our objective is to preserve and exhibit historical artifacts. There may, however, be two exceptions: if several like items exist and a donor has given permission to sell one or if an object is beyond repair or restoration. Of course, some acquisitions are given specifically for sale with the proceeds designated for the Museum Fund.

AWA Electronic Communication Museum

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Hours: May 1 through Oct. 31 — Sunday, 2-5 p.m.; also, June 1 through Aug. 31, Saturday, 2-4 p.m. and Wednesday, 7-9 p.m. (Closed holidays.)

Group Tours: By appointment.

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Amateur Station: W2AN

Mailing Address: Bruce Kelley, Curator, 59 Main St., Bloomfield, NY 14469

MUSEUM ON THE INTERNET

http:/www.ggw.org/freenet/a/awa/

The AWA's World-Wide Web home page continues to attract world-wide attention. The period prior to the recent annual conference was particularly active. We received inquiries from all over the world about conference matters, memberships, publications, donations, museum tours and the like; some by Internet e-mail, some by conventional "snail mail."

When logged on to our home page, you can e-mail questions or comments to the AWA by clicking on N2RSM or K2GBR near the bottom of the page.

AWA conference attendees from four continents admire Jim Chew's restoration of the Museum's 1919 104 Marconi receiver. Members from nearly a dozen countries signed the museum guest book.

MUSEUM BENEFACTORS

Recent donations in record numbers have ranged from magazines and books to exceptionally fine equipment, and the Museum committee thanks the following donors:

John Anderson
Bill Beckett, W2NBK
Bill Booker, W4WZU
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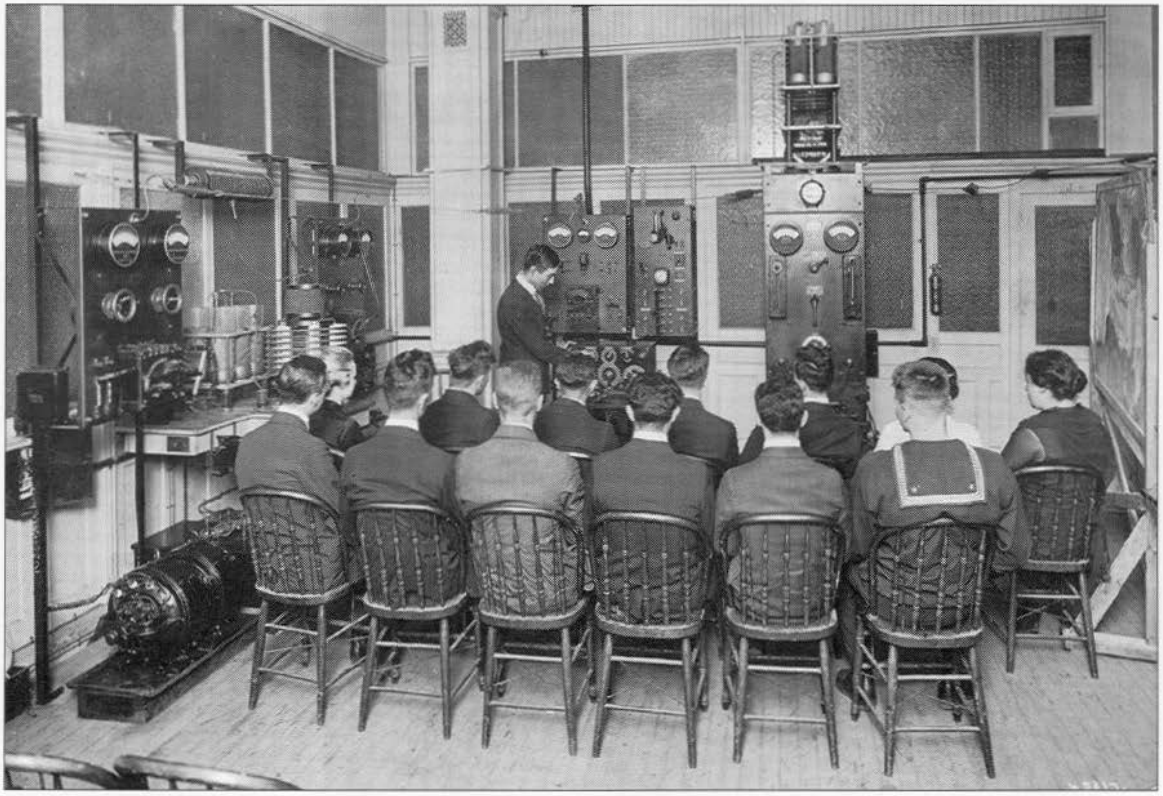
Eric Lewis
Fred Linn, W9NZF
Frank Marks, W2IEC
Mal Nichols, W8ACM/8AYM
Alan Parrish, W1KKP
Mani Pires
Tony Prasil
Tom Rosica, W2GIR
Ross Smith
Dave Sowinski
Bob Thomas, W3QZO
Ralph Thomas, W2UK (sk)
John Uscinowski, KE2O
Al Wagner, WB2BNJ



MYSTERY PHOTO

This beautifully sharp and detailed photo comes to us courtesy of Phil Weingarten, curator of the Forest Hills Wireless Museum in Forest Hills, NY. Some AWA veterans might recognize the instructor of this class. We also invite comments on the time period of the photo, the equipment on display, and the organization conducting the class.

Do you have an interesting and enigmatic photo from any period of radio history? The OTB would like to consider it for publication on this page. Send your photo, along with the story behind it, to Marc Ellis, Editor OTB, PO Box 1306, Evanston, IL 60204-1306. All photos will be returned.

The answers to the May and August mystery photos are *on page 32.*